



IMPERIAL INSTITUTE
OF
AGRICULTURAL RESEARCH, PUSA.

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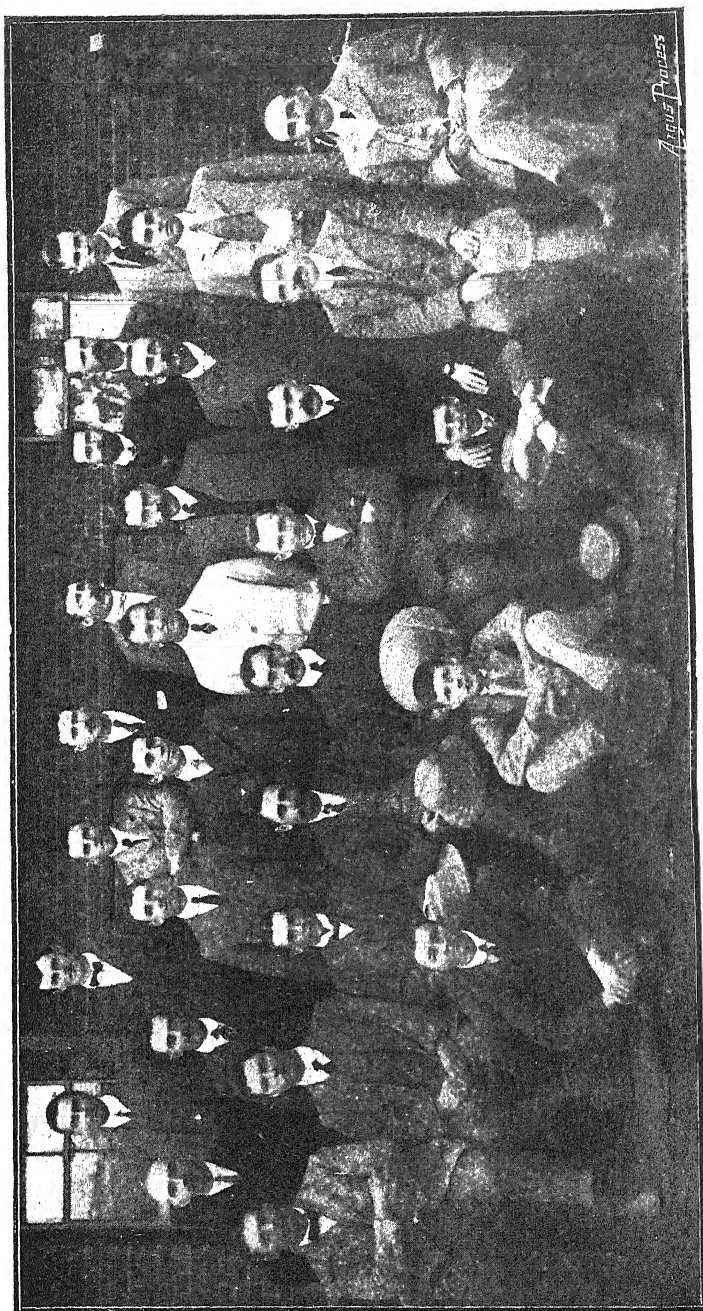
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Agnes Palmer

Group of Lecturers and Farmers attending the Lectures on Agriculture held in Salisbury during August.



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Editorial.

Correspondence on subjects affecting the farming industry of Southern Rhodesia is invited. Enquiries will be replied to direct, or through the medium of the JOURNAL. An interchange of ideas and suggestions between farmers will be particularly welcomed. Contributions of a suitable nature for insertion in this JOURNAL will be much appreciated. All communications regarding these matters, and advertisements, should be addressed to the Editor, Department of Agriculture, Salisbury.

The late Mr. J. S. H. Meikle

The death of Mr. Stewart Meikle, of Salisbury, at the early age of forty-seven years, is a sad loss to Rhodesia, and particularly to the agricultural community. The farmers of this country have much to thank the late Mr. Meikle for. He always took an active, if unostentatious, part in forwarding their interests, and he was regarded by all who knew him as a sage counsellor and a good friend in trouble. His knowledge of the veld, of farming conditions in Rhodesia, and of current local affairs was unrivalled, and he was ever at the disposal of all who required advice or assistance. More than any other

private individual, Mr. Meikle was instrumental in bringing up and establishing on the land desirable settlers, and there are many who owe to him their start in life. Himself a very large owner of land, he was a great opponent of land-locking, and an example to others similarly situated of how to treat their estates and to rise to the responsibilities which these entail. He will be greatly missed in Rhodesia.

Lectures on Agriculture

The recent course of lectures delivered in Salisbury is described at length in this issue, and we also publish a group photograph taken by the Burlington Studios, Salisbury, of the lecturers and students. It is realised that many are unable to leave their farms for the requisite time to attend such courses of instruction, and so far as possible to meet this difficulty lectures by the technical staff of the Department of Agriculture are arranged in conjunction with Farmers' Associations wherever a desire for such is expressed. During September meetings have in this way taken place at Enterprise, Hartley, Salisbury, Gwelo, Gatooma, Headlands, Macheke and Lalapanzi, and the interest shewn and appreciation expressed is ample proof of the need and utility of these lectures. The delivery of the address leads to discussion and interchange of ideas and experiences, and to the consideration of practical points and the application of principles to local conditions in a manner impossible to attain through private reading or through the medium of this Journal.

The Need of Bulls

The unfortunate and widespread outbreak of foot and mouth disease amongst cattle in England precludes for an indefinite period all prospect of procuring breeding stock from there. Our need for bulls of pure breeds is very great, perhaps the most pressing of all our requirements. Most farmers now possess sufficient cows to warrant them keeping at least one good bull, whilst with many the need is for a number. The enormous advantage of improving the class of cattle is everywhere apparent. The present is a most critical time, for whilst

the numbers of breeding stock are comparatively small it is possible, by the use of pure bred bulls, to influence a far larger proportion of the future breeding stock of the country than if we wait until the numbers are greater and the stock has been sired by nondescript or native or inferior bulls, as is now too often happening.

In this connection several instances have come to our notice of ignorance of the arrangements whereby the Government undertakes the purchase on easy terms of pure bred stock in the Union, for farmers resident in Southern Rhodesia, and we take the opportunity of directing attention to the notice detailing terms, etc., published in the Departmental Notices of this issue.

Cattle from Queensland

To meet the difficulty indicated above, the Administration is at present considering the question of procuring suitable stud bulls from Australia, especially from Queensland, in parts of which, as here, redwater is endemic, and where otherwise the conditions are believed to resemble those of Rhodesia. Before embarking on such an enterprise it is desirable to know what measure of support it is likely to receive, and at the time of writing an encouraging number of provisional applications and enquiries have been sent to the Department of Agriculture. It is not only the purchase of one consignment of stud stock that is in view, but the possibility of opening up a new source of supply of both good sires and a suitable stamp of foundation stock as well. These are both pressing wants here at present, and if a trade can advantageously be opened up it will be a matter of congratulation. The matter is receiving the fullest and most careful consideration.

A Ploughing Competition

Under the auspices of the Makwiro Farmers' Association a ploughing competition took place on the 26th and 27th of August, on Mr. Dickson's farm Pollockshields. It evoked much local interest, as the object was to find ploughs suitable for working the rich black vleis of the district, a very peculiar

soil, tenacious and hard, yet once broken up friable and porous. If ploughed when wet it readily becomes puddled and sets so firm as to be impossible for cultivation. It must, therefore, be worked fairly dry. Disc ploughs make no impression upon it. Once a good tilth is produced the soil yields abundantly and a loose mulch is easily maintained. This problem four firms set out to solve—Messrs. North & Co., who initiated the trials; Messrs. Philippi & Co., Philip & Co., and the Bechuanaland Trading Association. Classes were arranged for breaking ploughs, two and three furrow, both of which were won by the Renown plough, made by Messrs. Ransomes, Sims & Jefferies, of Ipswich, England, and represented by the B.T.A. This plough is of strong and simple construction, and did its work smoothly and cleanly, and is easy to manipulate, and was generally praised by those present.

For general utility ploughs two classes were arranged, the first place for two furrow ploughs being adjudicated again to a Ransomes, Sims & Jefferies plough, the Monarch, whilst for three furrow ploughs of this type the first prize went to the Columbia, made by the Cockshutt Company, represented by Messrs. North & Co. Twelve ploughs competed, including the Columbia, Syracuse, Moline, and Ransomes, and there were also a few single furrow and ridging ploughs present for demonstration. The judges were: The Director of Agriculture and Messrs. Curle, Celliers, Smith and Fraser.

The value of such a competition is, of course, purely local, and the results cannot be taken as conclusive, except for the conditions of the trial. It would be a mistake to condemn generally ploughs unsuccessful in one particular instance. It is only by comparison and demonstration in actual use that the relative merits and defects of ploughs can be judged, and besides the implement, the manipulation and the span pulling have something to do with the result. The educative value of such a trial is undoubtedly very beneficial to all concerned.

A Six Furrow Disc Plough

Every farmer in Rhodesia appreciates the advantage to be gained by increasing the number of furrows ploughed by one span of oxen and one driver, voorlooper and ploughboy in

these days of scarce labour. It is also realised in practice that one four furrow plough can do more and better work than two two's. On the same grounds one six furrow should do more than two three furrow disc ploughs. Five furrow ploughs are occasionally met, but hitherto this has been regarded as the limit on account of the increased draught.

At the request of Mr. R. G. Garvin, of Sleamish, Mazoe, the firm of Messrs. Ransomes, Sims & Jefferies have constructed specially for him a new model of their well-known multiple disc plough, having six discs on the beam, each taking ten inches, thus covering five feet at a time. Certain small, but very essential, modifications were devised with a view of reducing the draught and facilitating steering, and these have been introduced with conspicuous success. The steerage rod actuates only the furrow wheel, and the hind wheel, instead of being of the same pattern as in the usual form of Ransomes' disc ploughs, is fitted with a wide tyre and runs free, except when the plough is in work, when it is held in place by a clutch attached to the wheel bracket. By this means great ease in steering and in turning round is secured. The land wheel, that in front on the near side, is also of a different form. All the wheels run straight, thus materially diminishing friction. Owing to these improvements it is found possible to work with a span of eighteen oxen, and even fourteen have on level ground drawn the six discs without difficulty. Contrary to what might be anticipated, the plough negotiates inequalities of the land quite readily, and seems to ride particularly smoothly. If steam ploughing comes into vogue, as seems not unlikely, such six furrow disc ploughs ought to be useful for such operations as well as for the ordinary ox draught.

The Southern Border

The Government has recently determined to extend the fence along the Tati Concession-Rhodesia boundary from its present termination southwards to the junction of the Shashi and Ramaquaban Rivers, thus giving a continuous fence from that point to the extreme south-western corner of the Territory where the border line turns northwards up the Pandamatenka Road. The frequent accidental and illicit transgression of the

frontier by cattle gives cause for apprehension lest disease, in particular the dreaded scourge lung sickness, should be introduced. Police patrols or fences alone are inadequate, but combined these measures furnish, as experience shews, a fairly effective protection. It seems difficult to get public opinion to realise the magnitude of the dangers of illicit movement and the enormity of the offence of cattle running, risking for the sake of individual gain the safety and well being of the live stock of the country—the mainstay of the prosperity of such a large proportion of the community.

The Utilisation of Maize

Whilst attempts made in the past to utilise maize stalks for the production of sugar on a large scale have not proved a commercial success, attention has again been drawn to the matter by Mr. F. L. Stewart, of Pennsylvania, who has for many years devoted his time to devising a profitable means of utilising the maize plant for the simultaneous production of sugar, paper and alcohol. Two years ago Mr. Stewart stated that his work had reached a stage of development which gave assurance that these three products are producible from the maize plant at a much lower cost than from any other known source. Although no extensive trials have, so far as we know, been carried out in America or elsewhere to prove the correctness of Mr. Stewart's opinion, it is a statement of considerable moment which, in a maize growing country such as ours, calls for careful investigation. This issue contains an interesting report upon an investigation conducted by our Agricultural Chemist into the "sugar phase" of the question in respect to Rhodesian grown maize, which, whilst instructive and encouraging, also serves as a warning against unduly optimistic expectations.

Rural Telephones

The announcement of the facilities offered by the Department of Posts and Telegraphs for the establishment of telephones between farms and local centres, referred to in our last

issue, has resulted in a number of applications for such facilities being received. These are now under consideration by the Government. Communications on this subject should be addressed to the Postmaster General direct. Applicants are recommended to furnish information as to whether hardwood poles are obtainable near the route of the proposed line, and to indicate the nature of the ground to be traversed, whether mountainous or level, whether much vlei ground intervenes, and if there is much bush to be cleared away.

Farmers' Associations

The number of Farmers' Associations in the Territory is constantly expanding, the latest additions being one at Shamva, of which Mr. G. M. Mowbray is secretary, and another at Que Que with, as secretary, Mr. A. J. Bowman, of Que Que. The Makoni Farmers' Association has been revived, Mr. J. A. Tapson being president and Mr. W. S. Tapson secretary. The meetings will be held at Rusape. It is a sign of the rapid development taking place that these organisations are springing up all over the country, and amongst other useful purposes that they serve may be mentioned that of serving as a link between the farmers and the Department of Agriculture.

Railway Rates on Milk Bottles

It is announced that the B. & M. & R. Railways have agreed to a reduction on the rate charged for milk bottles to half third-class rate over all sections of this line. The South African Railways have also agreed to these articles being included in the list of dairy appliances shewn in the S.A.R. tariff book.

The bottles referred to are those made specially for the purpose of carrying milk, together with which a special wood fibre stopper is used. The Municipalities of Salisbury and Bulawayo make the use of these bottles compulsory for the retail milk trade, and their general adoption by milk purveyors in Rhodesia is highly desirable, both on hygienic grounds and

in the interests of the dairyman, as once sealed, these bottles cannot be tampered with without the knowledge of the consumer.

Hitherto the cost of a pint bottle has been 9d., and it is hoped that the reduction in the railway rates may enable merchants to reduce this price.

Reduction of Rates on Dip

On another page will be found an announcement of a reduced railway rate on cattle and sheep dipping fluids and powder. Railage has formed an important proportion of the cost of this article delivered to the Rhodesian farmer, and it is confidently anticipated that the reduction now made will reach the consumer.

Distribution of Tobacco Seed

The Department of Agriculture has a small quantity of tobacco seed of the Virginia, Turkish and Cigar leaf varieties, for distribution amongst farmers for experimental purposes. Those desirous of obtaining seed for small trials should apply to the Tobacco Expert, Department of Agriculture, Salisbury, stating the variety required.

Extracts from the Annual Report of the Government Agriculturist and Botanist.

SOIL FERTILITY.—There is evidence on the older established farms in the Rhodesian maize belt that continuous cropping is tending to reduce the average acre yield. Much of the red land of Rhodesia is only of moderate fertility, while the granite soils are as a rule distinctly poor. A reduction in the cost of artificial fertilisers, in order to place these within reach of the ordinary farmer, would have a far-reaching effect by increasing the total maize production of the country. Rotation of crops and manuring with kraal manure can only be indulged in at present to a limited extent, and the fertility of the soil is a national asset which every endeavour must be made to maintain. Much of the wheat lands of Canada have gradually approached a state of infertility, due to continuous cropping without manure, and the same fate will befall the maize lands of Rhodesia unless farmers are enabled to procure artificial fertilisers at a price which makes their use possible. A reduction of railway rates on articles calculated to increase the country's production, and particularly on artificial fertilisers, would in a few years handsomely repay the Railways by the increased carrying trade which would result. It is instructive to note that Sir Thomas Price, until recently general manager of the South African Railways, advocates this as a sound railway policy.

HOME FEEDING OF GRAIN.—Largely attributable to the reduced prices obtained for maize last year, and also to the visit of Mr. Loudon Douglas, the thoughts of many farmers have been turned towards home feeding, and pig-raising is receiving greater attention, though as long as there is any shortage in

maize and local prices rule as high as at present it will be found more profitable to sell the grain direct rather than to convert it into pig products.

Desirable as is the policy of home feeding, the export trade in maize must not be lost sight of, and every effort should be made to encourage and establish this. When Rhodesia's present export of perhaps 50,000 bags per annum is compared with that of the Union of South Africa, with its hundreds of thousands of bags per annum, one begins to realise how comparatively small is the Territory's present maize production compared with its capabilities. Rhodesian maize is second to none in quality, and the type grown is eminently suited to meet the requirements of the European manufacturers. An assured market is available for all the maize that Rhodesia can produce. Until stock increase in number and quality, however, it is useless to urge that home feeding will bring about a largely increased production of maize. The surest means of achieving this is by facilitating and cheapening the conditions of export, by improving means of transport between producing centres and local markets, and above all by reducing the cost of fertilisers, so that those settlers occupying sand veld farms may be able to purchase artificial fertilisers more cheaply, and so enter the market as maize producers.

EXPERIMENT STATION, SALISBURY.—The work here has been pursued on the lines indicated in my previous reports, and further encouraging results have been obtained. Successful crops of Victoria wheat were again grown, and if this season's trials confirm these I shall feel justified in recommending the sowing of this wheat by farmers on a much larger scale. Owing to partial failure of the maize crop, several farmers have already purchased seed of this wheat and have sown fairly extensively, so that the present season should definitely prove its value as a summer crop. The annual records of the more important experiments have again been published in the *Rhodesia Agricultural Journal* and reprinted in bulletin form.

More than 140 farmers, including not a few from Matabeleland, have visited the station and inspected the plots, as also a deputation of some dozen members of the Mashonaland Farmers' Association. Amongst the more important experiments conducted this year with annual crops, the following may be enumerated :—

Variety Trials.

	Varieties.		Varieties.
Linseed	5	Millets and hay grasses	5
Sugar beet	2	Mangels... ..	3
Swedes, turnips and kohl rabi	4	Carrots	2
Chicory... ..	2	Rape	3
Beans... ..	32	Lupines... ..	3
Summer wheat and oats...	9	Cotton	6
		Vetches	3

The majority of these occupied quarter or eighth-acre plots, and with but few exceptions yielded satisfactory crops, the superiority of some varieties over others being, however, well marked.

Permanent plots of lucerne, castor oil, cassava, sugar cane, Napier's fodder, Mauritius hemp, sisal hemp, Caravonica cotton, New Zealand flax and silvery ramie were also under observation. The dry-land lucerne (Provence) of two years' standing is gradually dying out, in spite of inoculation with soil from Cape lucerne fields and in spite of generous dressings of lime. Nodules are present on the roots, but nevertheless the plants are unthrifty. Better results are being obtained with a stand of lucerne established after ground-nuts the previous season. This experiment is intended to test whether the nitro-bacteria organisms present in abundance on the roots of the ground-nut will adapt themselves to the lucerne, but so far this has not been the case. It is somewhat remarkable that the lucerne bearing nodules on its roots is making less satisfactory growth than that without nodules. The soil of both plots is similar, and both receive the same cultivation. It seems probable, therefore, that the improved condition of the lucerne after ground-nuts, in spite of the absence of root tubercles, is due to the benefit derived from the previous leguminous crop.

Both the red and the Zanzibar strains of castor oil have failed entirely in their second year, and as a perennial crop, at least in the vicinity of Salisbury, castor oil appears unsuitable. Caravonica cotton has also failed to make satisfactory growth, and with American upland and Egyptian cottons, has not given any satisfactory yield on this station.

WINTER PASTURE EXPERIMENTS.—Rescue grass (*Bromus unioloides*), Sainfoin (*Onobrychis sativa*), Cowgrass clover

(*Trifolium perenne*), Sulla (*Hedysarum coronarium*), Tall oat-grass (*Arca elatior*), Yorkshire fog (*Holcus lanatus*), and Perennial rye-grass (*Lolium perenne*), have died out entirely in their second year, being unable to resist the extreme heat and dryness of the heavy red soil during the winter months. It is probable, however, that in vlel soils and on the cooler sand veld some of these pasture plants will prove more valuable. For the red soils, similar to that of the Experiment Station, the following pasture plants, in order of merit, have proved most satisfactory for affording winter grazing: *Paspalum* (*Paspalum dilatatum*), Sheep's burnet (*Sanguisorba minor*), Sheep's parsley (*Petroselinum sativum*), Cocksfoot (*Dactylis glomerata*), Awnless brome grass (*Bromus inermis*), Toowomba canary grass (*Phalaris bulbosa*). These also, however, are giving more satisfactory results on moister soils. With the object of finding a substitute for lucerne on soils unsuitable to this crop, Egyptian clover (*Trifolium alexandrinum*) and Florida beggar weed (*Desmodium tortuosum*) have been introduced and promise well, the former as a fine-strawed leguminous hay crop and the latter as a perennial, at least up to three or more years. Arrowroot (*Maranta arundinacea*), contrary to expectations, is thriving sufficiently well to warrant a more extended trial.

The sowings for the present season's trials number over 300, included in which are variety trials with 26 different strains of Soya beans, 10 of other beans, 10 of potatoes, 6 of linseed, 6 of ground nuts, 2 of dry-land rice, 5 of quick-maturing strains of maize, 5 of Egyptian clovers directly imported from Egypt, and 30 of Summer oats and wheat, the latter including 8 of my own hybrids, which are passing through their initial trial for rust resistance; also comparative trials of mixed sowings of various millets and vetches, native melons for stock feed and indigenous oil seeds. A half-acre breeding plot of Salisbury white maize sown under the conditions of row culture is now being maintained, by means of which it is hoped to shortly obtain a fixed strain of this hybrid. One hundred small plots, varying in size from one-fiftieth to one-hundredth of an acre, are devoted to miscellaneous plants, such as Ginger, Indigo, Spineless prickly pear, Saltbushes, Spekboom, *Guizotia oleifera*, etc., passing through their initial trials. Those proving satisfactory will be grown more extensively next year. Short-

age of labour and drought during November and December have handicapped all experimental work, and resowing of many plots has been necessary.

The Forestry work of the Department has again been conducted at this centre, the work being performed by the ordinary staff of the station.

EXPERIMENT FARM, GWIBI.—In view of the expectation of a considerable number of pedigree stock being placed on the farm this year, ample supplies of winter feed were grown, some of which were sent to the Letombo camp, where the imported bulls were quarantined. Good summer crops of Salisbury white maize, velvet beans, cowpeas, teff grass, Boer manna, Japanese millet, mangels, linseed, oats and lupines were grown, and in addition about twenty acres of winter oats and rye on naturally damp land without irrigation. These latter crops were a striking success, and winter forage grown without irrigation will henceforth form an important branch of the farming operations. Owing to causes referred to in my last report, sowing of all summer crops was retarded unduly late in the season; otherwise even better yields would have been secured.

About 15 tons of pit silage was again made, and as usual turned out well. Experience appears to indicate that the pit method of ensiling is all that is needed in this country, and overhead masonry siloes are an unnecessary expense.

The crop of Hickory King maize was disappointing, largely owing to drought, late planting and poorness of soil. Only a small amount of selected seed maize, in all about 6,000 lbs., was therefore available for sale. More than 100 acres of new land has been prepared for crop, and the old lands, which have now been cropped for five years, are being fallowed or placed under renovating leguminous crops.

Five acres of Mauritius hemp (*Fourcroya gigantea*) have been planted out, in addition to two rows of plants on either side of the avenue for a distance of about half a mile, the object being to test this fibre crop on a commercial scale. A new well has been opened up, and a windmill erected.

More than 300 acres of land will be under crop next year, and, given a favourable season, the experiments should be of considerable assistance to the country. The summer sowings

include the following :—Maize, Salisbury white and Hickory King, 100 acres ; maize, manurial trials, 14 acres ; maize for silage, 8 acres ; summer wheats, 16 acres ; summer oats and rye, 26 acres ; Boer manna, 20 acres ; teff grass, 30 acres ; Japanese millet, 5 acres ; velvet beans, 25 acres ; Kaffir beans, 10 acres ; ground-nuts, 4 acres ; root crops, 10 acres ; pumpkins, 2 acres ; variety trials of linseed, 5 acres ; variety trial of soya beans, 4 acres.

The absence of well-bred cattle and the small number of other stock kept has up to the present greatly reduced the value of the farm in the eyes of the farmer, and for this reason it is seldom visited except by close neighbours. Pedigree stock, particularly cattle, form the magnet which draws farmers to experiment farms, and it is therefore specially gratifying to note that provision has now been made for the completion of the original plan of buildings, together with certain important additions, and also for stocking the farm with pedigree cattle. The present stock consists of 9 mules, 30 working oxen, 12 native cows, 10 yearlings and one bull—a pedigree shorthorn, "Favourite Pride," recently imported from England. Three young large black pigs—2 sows and a boar—were recently obtained for breeding purposes : while a small flock of Merino sheep, numbering 37, were drafted from the Botanical Experiment Station to the farm, and thus far are doing extremely well.

Shortage of labour and scarcity of rain during the early planting season have delayed all farming operations, and owing to the increased activities of the farm further white assistance has been made necessary, to meet which an assistant foreman has been engaged. In view of the resolutions regarding agricultural education passed at the last Agricultural Union Congress, arrangements have been made to take working pupils on the farm, preference being given to Rhodesian-born youths. Up to the present, however, no local applications have been received, and the vacancies may, therefore, probably be filled from outside Rhodesia.

NEW CROPS OF ECONOMIC IMPORTANCE.—The most important development of the year is in regard to the use of moisture-retaining soils for the production of winter cereals, to which I referred in my last report. The success of this method of crop-

ping has now been proved beyond any doubt, and since throughout the granite formation there are large tracts of land of suitable character, the production of wheat should shew a steady increase for the next few years, and there seems reason to hope that it will not be long before sufficient is grown to meet the present requirements of the country. Here again, however, the use of artificial fertilisers will be necessary, as the majority of the moisture-retaining soil is rather poor in fertility. It is in order to carry out systematic experiments with these crops that a granite soil experiment station has been most urgently needed, and the presence of suitable soil for this purpose has largely influenced the selection of the site for the Matabeleland Experiment Farm.

A demonstration of the possibilities of these moisture-retaining soils for winter cereals will have a far-reaching effect in Rhodesia. Not only can wheat be grown, but excellent oat forage and rye, and also probably threshing oats and barley. Under similar conditions good early crops of potatoes and winter onions are being grown, and the fact that the farmer possessing such land can keep himself supplied with green forage, barley, rye and oats throughout the dry season, places him in a position to practise dairy farming all the year round, and not during the summer months only, as is now usually the case. This fact is of great importance, and will have a direct influence when the question arises of establishing a central creamery and butter factory.

The experiments thus far conducted have been mostly on private farms, but as soon as possible the whole problem will be tackled systematically, and variety trials, manurial trials, dates of planting, etc., will be instituted. The co-operative experiment work with winter cereals under these conditions has already aroused widespread interest, and any definite results obtained on the experiment farms will be promptly and vigorously followed up by farmers.

Linseed has again given good results, and by the introduction of three new varieties, two evenly-ripening strains—namely, Pskoff and Yellow-seeded—have been secured. The fact that the variety previously grown in the country ripened unevenly was a serious drawback, but the introduction of Pskoff linseed, which is also several weeks earlier in maturing, over-

comes this difficulty. Samples of Rhodesian-grown linseed have been examined in England, and are well reported on. Stock farmers in the country are recognising the value of linseed for home feeding, and the crop is gaining in popularity on this account. The cost of exporting, even in 15-ton lots, is at present rather too high to encourage any large export trade, but presuming an average crop of about $3\frac{1}{2}$ bags per acre (the yield given by varieties under trial), the farmer could pay export charges and obtain a gross return to cover cost of production and profit of about £2 to £3 per acre, which compares not unfavourably with maize-growing on most classes of soil.

Summer Wheat.—Victoria wheat again gave a crop of 5 bags per acre when grown for the second year under the most exacting conditions for a summer wheat. The experiment was repeated on an acre plot on the Gwibi Farm with similar results. Ten acres of this wheat have been sown this year, in addition to extensive trials on private farms, and if Victoria wheat proves resistant to rust for the third season in succession, we shall feel justified in recommending it for sowing on an extensive scale. Several promising hybrid wheats have now been bred up, and are being tested for rust resistance on the Botanical Experiment Station this season.

Chicory.—This crop appears well suited to local conditions, and though the South African market is rather limited, it is nevertheless a profitable crop to grow on a small scale, particularly on light sandy soils, which can be dressed with farm-yard manure and artificials. Trial plots grown on the experiment station have yielded an average return of 2 tons of dry chicory per acre. The current value is £17 per ton landed in Durban, and part of the crop has been disposed of at this figure. The return per acre may, therefore, be estimated at about £30 to £40, a third to a quarter of which is, however, absorbed in railing the product to the market. Owing to the labour of harvesting and handling, chicory can never be grown by individual farmers on a very large scale; but as a side-line, and where the grower is sure of his market, it is likely to prove a profitable crop.

The results of experiments carried out during the last two seasons have conclusively proved the suitability of the following crops to local conditions :—

Velvet beans (*Mucuna utilis*) are one of the most certain as well as the heaviest cropper of any bean grown for fodder purposes. The hay is readily eaten by cattle and mules, while the value of the crop as a soil renovator has been conclusively shewn on the Gwibi Experiment Farm.

Buckwheat (*Fagopyrum esculentum*) has been grown successfully, and is largely used for fowl feed.

Teff grass (*Eragrostis abyssinica*) has been proved well suited to local conditions, and can be grown successfully on all the heavier types of soil. It is an excellent heavy-yielding hay crop, and particularly useful as a catch crop or a smother crop for weeds on foul land.

Through demonstrations of these crops grown on the experiment stations, and with the advice of this Division, the acreage sown to Boer manna, ground-nuts, beans for human consumption, summer oats and paspalum grass is year by year extending, and we are now in a better position to indicate to farmers a profitable course of rotation, by means of which land may be rested from the staple crop every fourth or fifth year.

CO-OPERATIVE EXPERIMENTS.—Interest in these increases, and during the last season more attention has been given to testing winter pasture grasses, thus indicating a desire for better winter veld for cattle. During the summer distribution of 1910-11, seed was issued to more than 200 farmers, or double the number of those receiving seed the previous year. About 175 farmers have participated in the summer distribution of 1911-12. The slight decrease in number is due to shortage of labour having prevented many farmers, otherwise anxious to do so, from conducting experiments. Since labour has become more plentiful many applications for seed have been received, but, owing to the lateness of the season, these have been refused. About a hundred farmers participated in the winter co-operative experiments, an increase of twenty-five per cent. over the winter of 1910, calling for an issue of approximately 6,600 lbs. of wheat, oats, rye and barley seed.

COTTON GROWING.—The experiments with cotton were extremely disappointing, resulting for the most part in total failure. This was mainly due to late planting and early frosts in May. In this respect the season was exceptional, but in

any case it would appear that the localities best suited to cotton are at present too remote from railway communication, and too sparsely settled, for this crop to make much headway. The question of the cost of production, and the availability of sufficient cheap labour for picking, still remains open to doubt, not only in Rhodesia, but in other parts of South Africa, and the expansion of the cotton-growing industry is consequently slow.

EXPORT OF MAIZE.—As has already been stated, but little maize has been exported this year—about 10,000 bags in all have gone forward—the earlier consignments realising 28s. 3d. to 28s. 6d. per quarter, while the later shipments should have met an even stronger market. The grading of Rhodesian maize is now being carried out by an official of the Mozambique Co., stationed at Beira, and under these conditions we cease to control our own export of grain, and have no direct influence over the quality of the grain sent Home to the European market. In my opinion, this fact cannot fail in time to injuriously affect the reputation of Rhodesian maize. At the South African Maize Grading Conference, Rhodesia was represented by the Director of Agriculture.

Paspalum Grass.—The planting of *paspalum* is still extending, and large areas of land are being laid down to this grass. Except under very unfavourable conditions, *paspalum* remains green and affords good grazing in Rhodesia throughout the year. As indicative of the spread of this grass, it may be mentioned that one firm in Salisbury sold over one ton of *paspalum* seed last year, and this season has stocked two tons of seed, of which the bulk is already disposed of. This Division, in the year 1911, issued 500 lbs. of seed free of charge, and also supplied 80,000 *paspalum* slips at 5s. and 2s. 6d. per 1,000, deriving a revenue thereby of £15. Owing to shortage of labour on the Experiment Stations, only a limited number of slips has been issued this planting season. Improved winter pasturage is of vital importance throughout the whole Territory, and *paspalum* bids fair to supply this to a great extent, especially when augmented by other artificial pastures composed of such “grasses” as tall fescue, cocksfoot, awnless brome grass and sheep’s burnet.

FORESTRY.—A large demand exists for seedling trees, and many thousands more than we are able

to supply could invariably be sold. During the year under review, 25,500 seedling trees in trays were sold, affording revenue to the value of approximately £103. In addition, some 1,000 trees have been issued free to hospitals, Native Commissioners' camps and Police camps. The raising of valuable timber trees to form shelter belts, and for ornamental and economic planting, might profitably be extended, and it would appear that 100,000 trees could be readily disposed of annually. The question of legislation with regard to forestry, and provision for adequately exploiting and conserving our forest wealth, was raised in the Legislative Council.

HERBARIUM AND PLANT DETERMINATION.—Owing to pressure of other duties it has been impossible to devote any great amount of time to this branch of the work. About 70 determinations of economic importance, chiefly pasture grasses, weeds and suspected poisonous plants have been made, and a certain number of specimens have been forwarded to Kew to be worked up there. An extremely handsome shade tree—the only one of its kind, as far as I am aware, growing in Rhodesia—has been identified as the Australian Chestnut (*Castanospermum australe*). The tree appears quite at home in Salisbury, and should, therefore, be useful as an ornamental shade tree for street-planting.

A determination of considerable interest has recently been made by the Kew authorities of a tree growing on Mr. Part-ridge's farm Lendy, seven miles from Marandellas. The tree is lofty and well-grown, and is known to the natives as "Mutia-sinna-zito" (the tree which has no name). For years this has been an "Indaba" tree, and is stated by the natives to be the only one of its kind in the country. Specimens forwarded to Kew have been classified as belonging to the genus *Schrebera*. The occurrence of this lone tree on a slight eminence, from which a sweeping view of the country for miles around can be obtained, and in complete isolation as far as others of the same genus are concerned, has given rise to much speculation. It would appear that the tree has been introduced by the earlier inhabitants of the country, for, judging by its size and the usually slow growth of the native trees, its age must be very considerable.

Extracts from the Annual Report of the Government Entomologist.

It is an unfortunate fact that the average farmer is not much given to troubling himself about the loss sustained from insect attack unless it be of a more or less overwhelming nature. A loss as high as a quarter of the crop is apt to pass almost entirely unnoticed. Direct instances of this have not been lacking. On one occasion the writer took the trouble to count the missing plants in an average acre paced off from a field of maize, on which the farmer considered he had "a pretty good stand" of plants. Over 20 per cent. of the plants were found to be missing! The greater part of this loss was probably due to cut-worms, though a beetle, *Opatrum aequale* (to be mentioned again later), and certain leaf-eating beetles, had also contributed their share to the damage. The bulk of the loss was undoubtedly avoidable by the adoption of insecticidal methods when the land was planted. Other conditions being favourable, 10 per cent. could have been added to the return for this land, yet before the matter was pointed out to him the farmer was quite unaware of the toll that the insects had levied on his crop. This, however, is quite a mild instance of loss from insect attack. Too often a considerably heavier loss is sustained, and yet, because it is not noticed until too late, the attention of this office is not drawn to the matter at all. During a conversation with a tobacco farmer at one of the Agricultural Shows in June, it transpired that he had lost, according to his own computation, nearly 50 per cent. of last season's crop owing to an insect boring in the stems of the plants. No information of the matter had been sent to the Department, nor advice as to remedies sought. It is occurrences such as these that emphasise the necessity of the systematic touring of farms in different parts of the Territory, for which opportunity has been lacking. It is noteworthy that the farms that suffer most from pests at the

present time are the older ones, on which the same crop has been grown for a number of years. It is, of course, well known that a regular rotation of crops does much to keep a farm free from serious insect attack, other than such invasions as locust swarms. In Southern Rhodesia, however, with its one staple crop, conditions are exceedingly favourable for the increase of insect pests and for the attraction of native insects to feed upon the crops, such as the snout beetle mentioned in this and in my last report as injurious to maize. Apart from the employment of insecticidal measures, therefore, should no alternative crop to maize be found, the loss from insect attack may be expected to increase as years go by.

It is perhaps desirable to mention here an influence which the scarcity of labour is likely to have on the increase of the well-known maize stalk borer. Farmers in the Territory have in the past been comparatively conscientious in the collection and burning of the maize stalks on the land, and rightly so, as this is the only means of keeping this pest within bounds. Labour has, however, not been forthcoming in many cases for this measure during the past winter, and in many lands the stalks have been ploughed under from necessity, although the farmer was well aware of the wisdom of burning the stalks. The result of this is likely to be an increase in the damage to the maize crop from this pest.

The insect pests of crops are the most important in this Territory, with the exception of such insects or ticks as are concerned in the transmission of disease in animals or man. In other portions of South Africa, a great deal of attention has been paid to the enemies of fruit trees, to the comparative neglect of crop pests. In this Territory, however, the value of maize and tobacco grown far exceeds that of the fruit, therefore the researches of an official entomologist should be directed towards the pests of these important crops. For this purpose application has been made for the erection of a specially constructed insectary for the study of soil-inhabiting insects, and the grant of this would undoubtedly greatly increase the usefulness of this office to the farming community, facilitating, as it would, detailed research into the life histories of this somewhat difficult class of insects.

With regard to the matter of insect and tick-borne diseases, Southern Rhodesia is affected by these as much as any other part of South Africa, and considerably more than the greater portion. On the medical side the transmitting agent of blackwater remains undiscovered, and the writer is not aware of experiments being carried out in any part of Africa to this end. Regarding tick-borne diseases amongst animals, the Southern Colonies have carried out a very considerable amount of successful research, so that but little remains for further work. Horse-sickness, one of the heaviest handicaps to the development of the country, is at present engaging the attention, both from the veterinary and entomological points of view, of the Union Department of Agriculture, who, with their abundant command of funds, are in the best position to carry through the work successfully. The question of the possibility of blood-sucking flies other than tsetse being concerned in the transmission of trypanosomiasis still remains unsettled, and can only be settled finally by direct laboratory experiments. At the same time our experience in this Territory is not such as to produce much anxiety on the score of the possibility of the disease being spread to any extent away from the "fly-belts," although there are undoubtedly occasional outbreaks on what may be termed the outskirts of fly-areas which are very difficult to account for on the basis that each case of disease must be due to the bite of a tsetse fly. The writer is by no means persuaded that direct transmission does not take place through the agency of other flies, and, in support of this, it may be stated that Mr. Walter Jowett succeeded in conveying the disease in Capetown by means of either *Hamatopota* or *Stomoxys*. That flies other than tsetse are not capable of perpetuating the disease for more than a single season seems, however, to have been proved by experience, and may probably be attributed to the shortness of the lives of these insects. The need, therefore, of experiments to determine what flies, if any, are capable of thus conveying the organism from the sick to the healthy animal is not so great from a practical point of view as appeared at first, the tsetse being from all indications the fundamental factor in the matter.

IMPORTATION OF PLANTS, ETC., REGULATIONS.—The administration of these regulations has occasioned considerable work to the office during the year. The present system under

which the inspection of consignments of fruit, potatoes, plants, etc., at the ports of entry is carried out by the Customs officer, is not a perfect one, chiefly owing to the frequent changes occasioned by these officers going on leave. It is, however, the only system possible at present, as even at Bulawayo, where the volume of importations far exceeds that of the total of all the other ports, there is not sufficient work to occupy the full time of one man at all seasons of the year. In general the regulations have worked smoothly, though some difficulty has been encountered in dealing with large consignments of potatoes when these needed sorting owing to the presence of insect pests or disease. The special regulations regarding the importation of seed potatoes have had the gratifying result of rendering the European growers very careful as to the cleanliness of the tubers sent, and there has very rarely been occasion to sort out any consignment from oversea. A very few consignments have arrived unaccompanied by the necessary certificate concerning freedom from black scab (*Chrysophlyctis endobiotica*). In every case these consignments have been detained until the certificate was forthcoming, in default of which the potatoes were destroyed. Seed potatoes of South African origin have caused most of the difficulty in regard to sorting. Many consignments arrived very badly infested with potato tuber moth (*Gelechia operculella*) and root gall-worm (*Hederodera radicola*). Both these pests occur in the Territory, the former being the more generally distributed; the latter being regarded as the more serious pest from the inspector's point of view, as soil planted with infested potatoes may in a few seasons be rendered quite useless for the growing not only of potatoes but a wide variety of other plants.

Owing to the discovery of the highly injurious San José or pernicious scale (*Chrysomphalus perniciosus*) in the Transvaal, a Government Notice (No. 306 of 1911) was published, prohibiting the introduction into Southern Rhodesia of plants grown in the Transvaal, except under special permission from the Director of Agriculture. This is a temporary measure to protect the interests of Rhodesian fruit-growers, whilst the investigations as to the distribution of the pest in the South African Union are proceeding. The discovery of this pest within the borders of South Africa must be considered as not less than a calamity. For years past the efforts of the Agricul-

tural Departments of the various South African Colonies have been directed towards keeping the country free from this, as one of the chief pests likely to affect adversely the cultivation of deciduous trees within our coasts. It is not that the pest is in any way likely to destroy properly-kept orchards, but that its presence necessitates the regular spraying of the trees, and so imposes a yearly tax on the fruit-grower. Unfortunately, such a long start has already been obtained that apparently it is very questionable if total eradication is possible. It is to be hoped, however, that the further spread of the insect may be checked.

The number of consignments of imported plants, etc., inspected at the different ports of entry is given below :—

1911.	Bulawayo.	Salisbury.	Gwelo.	Umtali.
January	129	32	27	16
February. . . .	151	46	25	10
March	160	52	20	...
April.	171	27	13	...
May	174	14	20	...
June	153	25	20	2
July	130	21	21	7
August.	177	28	17	3
September . .	179	36	18	6
October	193	36	14	5
November . . .	195	78	9	4
December . . .	216	86	10	24
	2,028	481	214	77

Grand Total 2,800

The total is an advance of 380 consignments on that of last year, and 729 more than in 1909.

NURSERIES ORDINANCE.—The list of registered nurseries in the Territory numbers 14. These nurseries are totally inadequate to produce the quantity of young trees required by the country, and very little serious attempt is made by any to develop a trade in citrus stock, for which there is a good demand. The majority of the stock in these nurseries, with the exception of citrus, is in clean con-

dition. Two blocks of citrus stock have been placed in quarantine during the year on account of the presence of Red Scale; one was released after thorough cleansing by the proprietors, and the other remains in quarantine at the close of the year.

LOCUSTS.—There has been but one very doubtful report of the occurrence of locusts in the Territory during the year. The one report was almost certainly a case of mistaking grasshoppers for locusts. The whole of South Africa is at present apparently free from the pest, and there appears to be no danger of a fresh invasion in the immediate future.

TSETSE FLY INVESTIGATIONS.—A very considerable amount of time has been devoted to investigation with regard to the breeding and other habits of this pest. Briefly summarised, the advance in our knowledge consists of—(1) the discovery of the pupæ in numbers in their natural surroundings, furnishing us with some knowledge of the breeding haunts of the fly; (2) observations on the change in the distribution of the fly at different seasons and the conditions that influence this change; (3) other notes on the habits of the pest, especially in regard to its tendency to follow a food supply and the distance to which it may be carried, these facts having relation to the outbreaks of trypanosomiasis on farms some distance from the permanent “belts”; (4) observations on the sex ratio at different seasons; (5) experiments on the possibility of trapping tsetse on animals with cloth smeared with bird-lime; (6) contributions to the mapping of the fly-belts in the Territory. It may appear that whilst these investigations have advanced our knowledge of the bionomics of the tsetse, the scientific value of the results has up to the present been more obvious than the economic. As the latter can only be obtained through the former, progress in the one is, or may be, progress towards the other. It cannot be said, however, that there is at present any immediate prospect of a solution of the fly problem.

INSECT PESTS OF THE YEAR.—The more notable insect pests that have received some attention during the year are as follows:—(1) Snout beetle (*Sciobius* sp.?) re maize. This pest was engaging attention at the time of writing my last report. The damage caused by it on the infested farms was very severe, but enquiries proved it to be very local in its attacks, being apparently confined to a few farms near Salis-

bury. The beetle did not put in an appearance this season on the land where last season it swarmed, but the peculiarly dry spring may be responsible for this. (2) A deltoid moth injurious to lucerne. Adult moths were bred from the caterpillars and the date of emergence noted. (3) Cabbage aphid (*Aphis brassicae*). Some attention was paid to the parasitisation of this pest; and spraying experiments were conducted. (4) Chafer beetles. Some experiments to determine the effect of spraying against these pests were spoiled by the lateness of the spring. (5) *Tribolium confusum*. This beetle, usually a granary pest, assumed the rôle of a destroyer of baled tobacco in Salisbury during the year. Although the adult beetles lived and fed freely in the tobacco, experiments with a view to finding if they would breed in this substance proved negative, but the result cannot be considered conclusive. (6) Cut-worms. Two different species were bred out during the year, but these pests have not yet received the attention they deserve. (7) *Opatrum æquale*—a Tenebrionid beetle which proved very injurious to maize seed in the field and also to tobacco plants, owing to the dry spring. The habits of the pest have been studied and a remedy found.

Extracts from the Annual Report of the Agricultural Chemist.

A small amount of investigation and research in matters relating to the general agriculture of Rhodesia has been conducted, but the major portion of my time has been devoted to the analysis of samples of an agricultural nature sent in for examination, and to the furnishing of information by correspondence and interviews. Before reporting upon the more important matters dealt with during the period under review, brief reference may be made to them as follows :—

SOILS.—A number of soils now under cultivation in various parts of the country for the production of bright tobacco has been submitted to analysis with a view to determining their points of similarity and difference, and acquiring data regarding the types which give the best results. Among other soils—virgin and cultivated—which have been received for examination, several have been submitted from infertile areas for information in respect to the cause of infertility, and the best means of dealing therewith. Some of these have been analysed and advice given regarding the best available methods of treatment, and a commencement has also been made to investigate other soils in which the cause of infertility is not apparent; but with these little progress has been made, as the research work entailed is considerable, and other duties have demanded my attention.

MANURIAL EXPERIMENTS AND ARTIFICIAL MANURES.—*Manuring of Tobacco.*—During the past season an experiment on the manuring of tobacco was carried out on Mr. L. Black's farm "Stapleford," Salisbury, for the purpose of acquiring information in regard to the effect of various fertilisers upon the yield and quality of the leaf. The results of this trial will be dealt with later. Arrangements have been

made with growers at four centres in Mashonaland to conduct a small manurial trial on their tobacco lands during the present season, the object of the experiment being to obtain further information regarding the most economical manurial treatment on light tobacco soils. The trial has of necessity to be limited in scope, as the average farmer has neither the time nor the facilities for dealing with small plot experiments. This, coupled with the fact that the trials should be repeated over a series of years, in order that the effect of seasonal variations from year to year be taken into account, and the experimental error reduced to a minimum, points to the need for a Tobacco Experiment Farm, where the necessary attention can be given to the growing and curing of the leaf.

Increased Consumption of Artificial Manures.—During the year 1910, the value of the artificial manures imported into Southern Rhodesia increased more than seven-fold when compared with the year 1909: the actual quantity brought in during 1910 being over 114 tons. The marked increase was, of course, largely due to the increased acreage under tobacco, and in view of the rapid development of the tobacco industry, the consumption of artificial manures will assuredly be much greater during this and subsequent years. In this connection I would point out that the present railway rates on fertilisers could be considerably reduced to the advantage of both the Rhodesian Railways and the farming industry, for it is very evident that a reduction of rates would result in increased consumption of manures, increased production, and, as a consequence, increased carrying trade for the railway—a fact that has already been realised by the Union Government.

LIMESTONES, SLAKED AND UNSLAKED LIMES.—During the year a number of limestones and travertines (vlei limes) have been received from various parts of the country for report as to their economic values. Of the samples examined in the laboratory during the past two years, several, which occur within reach of a market, have proved to be of very good quality, and will yield "burnt limes" highly suitable for mining, building and agricultural purposes, yet we find on referring to the latest trade returns published for this Territory that, during the year 1909, over 500 tons of lime were imported, and that this

amount was more than doubled in 1910. This ought not to be the case, for lime formations occur within our borders which can yield a product of really good quality, abundant in quantity, and suitable in all respects for the requirements of the country. The bulk of the imported lime has, doubtless, been used on the mines, but, with efficient burning, there should be no difficulty in producing locally a lime for cyaniding purposes, which will rival the imported article and more than satisfy the standard fixed for the material by the mines of the Rand. In the past, the fault of Rhodesian-burnt limes examined in the laboratory has been the incomplete burning of the raw material; or prolonged exposure of the burnt product to atmospheric action whereby the lime has in part reverted to the form in which it existed before it was placed in the kiln. More attention is now being paid to the process of burning, consequently it is probable that the fault referred to will be met with less frequently, and so soon as the consumer is confident that this defect no longer exists, some of our limes should assuredly meet with greater favour among the mining community.

MILK.—An enquiry into the quality of the milk yielded by two classes of native cows—the German East African and the Victoria type of Mashona—which was in progress at the end of last year, was completed in the early portion of 1911. The results of the investigation, which constitute the first evidence recorded regarding the percentage amount of fat in the milk of two of our native types, shew that the milk of these animals is of very rich quality.

UTILISATION OF THE MAIZE-PLANT FOR SUGAR, ALCOHOL AND PAPER PRODUCTION.—Attention has been drawn to the above matter in America by Professor Stewart, who recently stated that, whilst the manufacture of sugar, paper and alcohol from the maize-plant is not yet fairly established, it has reached a state of development which gives assurance that, wherever maize can be grown to advantage, the three products mentioned are producible from the different parts of the plant of unexcelled quality, and at a very much lower cost than from any other known source. Stewart maintains that if the cobs are removed from the maize-plant in the milky stage, the sugar content of the stalks increases to such an extent that “the stalks become practically sugar-canes.” This point has been

investigated on a small scale at the laboratories with a white dent variety of maize during the past season, and the results obtained do not support Stewart's contention. The fact that the stalks with which I had to work were of rather indifferent growth may have had some influence upon the results obtained. Arrangements have been made to carry out further trials with five varieties of maize during the coming season, viz., Sweetcorn, Hickory King, Salisbury White, Boone County and Golden Eagle, and, further, to determine the sugar content of three varieties of native "sweet reed" grown in well-cultivated soil.

MISCELLANEOUS ANALYSES.—Among samples of a miscellaneous character analysed during the year are included waters, arsenite of soda for dipping, salt, shales, gums, latices, cave deposits, ant-heap earths containing lime in quantity, bats' guano and the examination of animal viscera for suspected poison.

Extracts from the Annual Report of the Agricultural Engineer.

During the year ended 31st December, 1911, I attended to 76 applications for my services.

As a result of my visits I have been able to recommend, lay out and give general advice upon a large number of small private irrigation schemes providing for the potential irrigation of about 2,800 acres, the largest scheme being one of 1,000 acres and the remainder varying from 300 to 2 acres in extent.

The principal irrigated crops at present appear to be wheat, oats, barley, potatoes, onions, green mealies, general classes of winter vegetables, orchards and lucerne. The value of irrigation is being more urgently realised every day, and almost every farmer I have visited has shewn a keen desire to make some use of any water running on his farm. The principal schemes advised upon have been simple gravitation projects from rivers or streams direct without storage. A few power pumping schemes have been advised, and a very few projects relying entirely upon storage. Advice has also been given with regard to well and bore-hole sites, opening up springs, drainage, milling plants, etc.

For small gravitation projects of 10 acres and under, the cost per acre may have reached £10, but for the larger projects I do not think this has ever exceeded £3 per acre; the average cost would probably work out at £2 per acre. For pumping plants £10 per acre may have been exceeded, but in most instances this increase would be counterbalanced, as the power was intended to be utilised to drive mealie shellers, grinders, etc., during the wet season, when not required for pumping purposes.

The largest project I have been able to recommend was one of 1,000 acres, and this was under very favourable circumstances with regard to water, quantity and quality of soil, settlers and marketing facilities. There seems a prospect of quite a large number of small schemes being carried out in the near future, such projects varying in potentiality from 300 to 5 acres irrigable.

Establishing the Creamery Industry in Rhodesia.

By W. J. PALMER, Organiser, Gwelo Creamery.

It should be pleasant news to residents in Southern Rhodesia to be informed that a modern creamery, with a capacity up to 2,000lbs. of butter per day, is now in course of erection at Gwelo—a central place on the main line of railway, 180 miles south of Salisbury and 113 north of Bulawayo.

Contracts for the necessary creamery and refrigerating plant have been made which will be installed as soon as the building is ready, and it is confidently expected that everything will be completed and the doors of the creamery opened for business by 1st February, or at latest the 15th March next. This industry will be owned and managed by the Commercial Branch of the Chartered Company, and will be run as a purely business concern on the same lines as the creameries—both co-operative and proprietary—which have proved so successful in the Free State and Natal, and which have been such an important factor in the agricultural progress of the south. It is a very fortunate thing for Rhodesian farmers that the Chartered Company have decided to establish this industry at such an early stage in the country's development and thus make a profitable market for all the cream which can be produced. From the purely business standpoint it would be wiser to wait until live stock conditions warranted capital investment in a venture of this nature, but the Company have rightly taken a broad view of the situation and have determined to lay the foundation of what will be a great dairy industry, regardless of immediate profits.

That the farmer will benefit by this decision goes without saying, for, while hitherto there has been little or no demand for cream except in the form of farm-made butter for which

there is not always a ready sale, it is certain that, so soon as the creamery is open, a steady market for cream of the proper quality will be established, and the prices paid will be sufficiently high to encourage farmers to devote their energies in the direction of dairy farming.

Of course, cream is a perishable article and cannot, therefore, be carried long distances during hot weather without deterioration, but from experience gained in the Free State and Natal, it is safe to conclude that all through the summer cream can be shipped to Gwelo from Umtali in the east and Plumtree in the south, or from Eldorado or any other station on the line, provided that proper care is taken in milking, cream separation and the subsequent treatment of the cream before shipment.

RATES FOR TRANSPORTATION.—The railway rates are quite low, comparing very favourably with those existing on the South African Railways, which are taken advantage of by thousands of farmers in the Union.

The existing rates on cream, as taken from the local tariff book, are as follows :—

Miles.	Per gallon.
1 to 25...	$\frac{1}{2}$ d.
26 to 50	1d.
51 to 75	1 $\frac{1}{4}$ d.
76 to 100.....	1 $\frac{1}{2}$ d.
101 to 200	2d.
201 to 250	2 $\frac{1}{2}$ d.
251 to 300	3d.

Empty cans returned free.

At these figures a farmer can send 3 gallons of cream from Salisbury to Gwelo for 6d. and get his empty can back free of charge. If this cream tests 45 to 50 per cent. fat, as it should, the rate per lb. of fat will be something less than $\frac{1}{2}$ d.—quite low enough to encourage producers of milk to support the creamery, even though their farms may lie some hundreds of miles distant from Gwelo. Transport by wagon or pack donkey is, of course, a different matter, and will be more

costly, but for those farmers who are not within convenient distance of the railway or the creamery itself, some co-operative arrangement will have to be made so that wagons will go along defined routes and pick up the cream cans from the different farms on the road. Thus the farmer 20 or 30 miles from his nearest station may, if not too isolated, still have an opportunity of disposing of his surplus cream.

To shew what can be done in this respect, I am informed that, before the railway was extended, some Griqualand East farmers sent their cream by wagon 80 miles to the rail head in Natal, and from there by rail to Nel's Rust. If it pays to do this in Cape Colony, why not in Rhodesia?

PRICES FOR BUTTER FAT.—It has been decided to adopt the procedure which is now generally followed by the best South African creameries and to grade all cream received into two classes, irrespective of butter fat contained, and prices will be fixed every three months in advance for the different classes. The prices paid for the first three months of the creamery operations delivered at the creamery will be as follows :—

1st class cream, $1/3$ per lb. butter fat contained.

2nd class cream, $1/1$ per lb. butter fat contained.

Cream will be classed at the creamery by the butter-maker in charge, according to the general appearance on arrival—the smell, taste and churning quality. First-class cream should contain from 45 to 50 per cent. fat, be even in quality, possess a good smell and flavour and be entirely free from objectionable odours—in fact, just such cream as will make the finest table butter. It may be somewhat acid, as it will be impossible to avoid that during the hot months. Second-class cream may contain too much acid, have undesirable flavours or be otherwise unsuited for conversion into finest butter; it may still, however, be churned and made into good butter for immediate sale, but at a lower price than the first grade.

CARE OF CREAM.—It will largely, if not wholly depend on the farmer whether his cream is graded as first or second class. If great care is taken to have the milking performed in a cleanly

manner, if the separator parts are washed thoroughly, scalded and kept bright and clean, if the milk is taken direct to the separator and the screw regulated for a 50 per cent. cream, and if the resultant cream is kept in a cool, well-ventilated place, free from objectionable odours and dust, then the chances are that it will be a first-class cream and paid for as such.

If necessary the cream can be held on the farm and shipped two or three times weekly, as available transport or train service permits.

TESTING THE CREAM.—On receipt at the creamery of a can of cream the net weight will first be determined, then a sample taken to ascertain the percentage of fat contained. The net weight of the cream and the percentage of fat being found, it is a simple matter to compute the weight of fat: this will be credited to the cream supplier at a first or second-class price, depending on the churning quality of the cream. It will thus be seen that from the patron's standpoint he will be sure of fair treatment, receiving credit for every pound of fat sent at a price commensurate with its butter producing value.

SUPPLY OF SEPARATORS AND CANS.—The Company will supply, if so requested, a cream separator and a number of suitable shipping cans to any patron of the creamery who proposes to send cream—these to be paid for out of cream supplied. Each patron will require at least three cans, which, with the separator, may cost up to £15. This represents the capital investment required for those farmers who already have cows and a small "kyah" or outbuilding in which the cream can be kept in good condition.

Of course, the skim milk, as it comes fresh and warm from the separator, is a valuable and nutritious food for calves—it lacks only the fat, which can be supplied in the form of linseed porridge or some equally cheap food material.

It is not the purpose of this article to go into the question of the management and feeding of dairy cows, the rearing of calves in a dairy herd, or the matter of labour involved in milking and separation; but it is necessary here to emphasise the fact, which experience has proved clearly, that it pays to produce milk and supply cream to a creamery, that even in a

small way the monthly cheque received by the farmer in return for cream sold is of the greatest assistance to him in providing necessary cash for conducting his farm operations and that, taking into account the large number of breeding stock in Southern Rhodesia, there must be, especially during the summer months, a considerable waste of milk, which should, in future, be converted into cream. This need not necessarily mean the starving of the calf: with a little care and judgment this undesirable result can be, to a large extent, prevented. Nothing also has been said here about winter dairying—this will surely follow—for it pays to feed for winter milk. At present we are more concerned about the supply of cream during the first three months of the creamery operations.

Every cattle-owner should give this subject his most serious attention, with a view to realising some cash from his surplus milk.

If interested persons will communicate with the writer at Salisbury on this subject, he will be glad to furnish any further particulars required.

Subterranean Water.

By W. M. WATT, Agricultural Engineer.

One of the most illusive forms of obtaining subterranean water is by means of an artesian bore-hole or well. The appellation "artesian" is derived from the Province of Artois in France, where, as the result of deep boring, water was first obtained which overflowed or spouted out above the surface of the ground. The principle of artesian water is very simple, although by many people very imperfectly understood. The accompanying sketches, Nos. 1 and 2, explain the principle involved. The subterranean water is contained in the porous strata and retained there by the impermeable strata above and below. When the upper impermeable strata are pierced by a well or bore-hole, the water in the porous strata is released and, in tending to find its level, flows or spouts out of the hole, according to the head of water behind. Artesian water is common to many countries, but the question before us is, is there any hope of finding it in Southern Rhodesia? Speaking of the greater part of the country, the writer is forced to reply in the negative. Our underlying stratum is granite, and our principal overlying strata, the schists. If above the latter formation we had some impermeable strata, the chances would be excellent, but this we do not generally have. In parts of the Territory around Bulawayo, Wankies, etc., we have basaltic rock and the forest sandstones, and at these localities artesian water might be found, but taking the Territory generally, where we have only the schistose or granite formations, there appears to be no reasonable possibility of obtaining artesian water supplies.

Ordinary water supplies are, however, very plentiful in the schist formation. By the term "schist formation" the writer includes the whole series of metamorphic rocks, frequently termed "gold belt," which overlie the granite formation. These schists are generally very fissured, and a large percentage of the rainfall finds its way through these fissure

veins and is retained as subterranean water. A well or bore-hole tapping these fissures may give rise to a very fair supply, but will require to be raised to the surface artificially, *i.e.*, by bucket or pump. In sinking in the schist formation it is not advisable to sink to any great depth (say over 200 feet), as beyond certain depths the weight of the overlying rocks tends to close the fissures of the lower rocks. Most bore-holes in the schists strike water within 100 feet from the surface.

The granite formation also gives fair prospects of obtaining subterranean water, but not where the formation is solid. Rotten or disintegrated granite is capable of carrying water in its fissures, but no appreciable amount of water can pierce the solid granite rock. The accompanying sketches, Nos. 5 and 6, are fairly characteristic of the granite formation. The two sketches might be considered together, as the waves or undulations of the solid granite may cross one another at right angles. Presuming bore-hole No. 12 (sketch No. 5) corresponded with bore-hole No. 16 (sketch No. 6), a good supply would be obtained; while if bore-hole No. 13 (sketch No. 5) corresponded lower down with bore-hole No. 17 (sketch No. 6) only a small supply could be expected, and no natural sumpage would be obtainable. Such a hole as this would very soon be exhausted, even with a sump bored or cut in the solid granite.

Subterranean water has the same tendency to find its own level as surface water, but owing to its having to find its way through a multitude of fissures, it does so very gradually; the smaller the number and size of the fissures the slower its movement will be. It is for this reason that many streams are stronger during periods of normal flow long after the wet season, and are very low (except during floods) in the midst of the wet season. This applies chiefly to streams in the schist formation, the rainfall taking months to soak back through the rocks to replenish the springs supplying the streams.

The supplies obtained from wells or bore-holes in this Territory are not, as a rule, sufficient to irrigate any large area of ground; the writer has not come across one irrigating more than 3 or 4 acres, and many are incapable of doing anything more than supply domestic wants. In the arid regions of the

CROWNED SURFACE

IMPERMEABLE STRAT

PERMEABLE STRAT

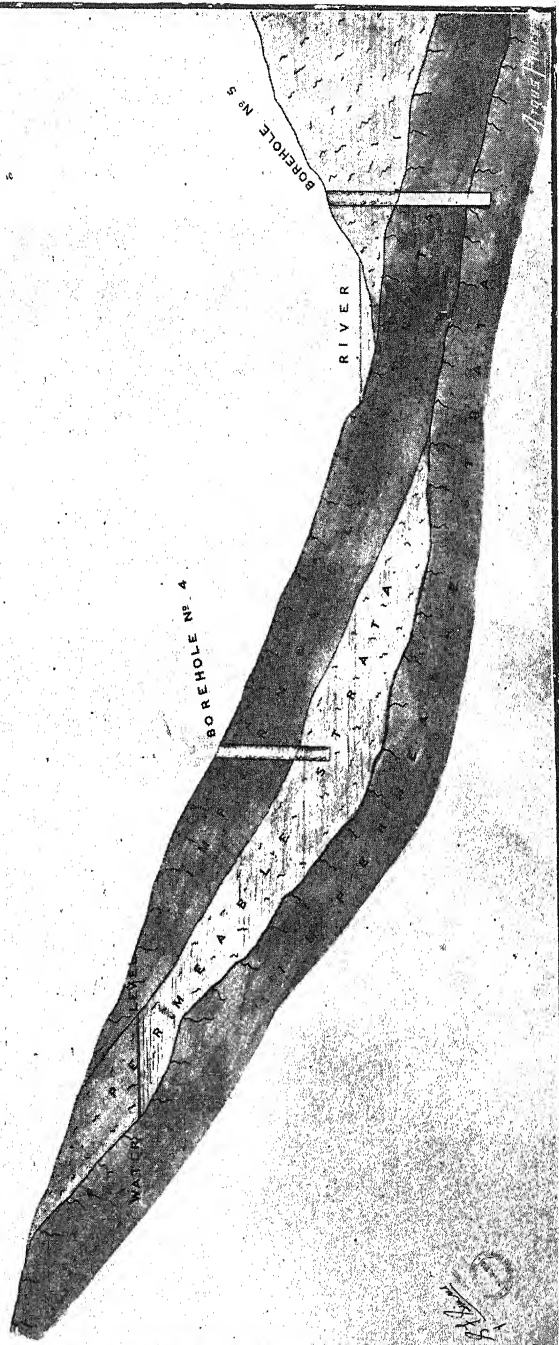
WATER LEVEL

BOREHOLE No. 1

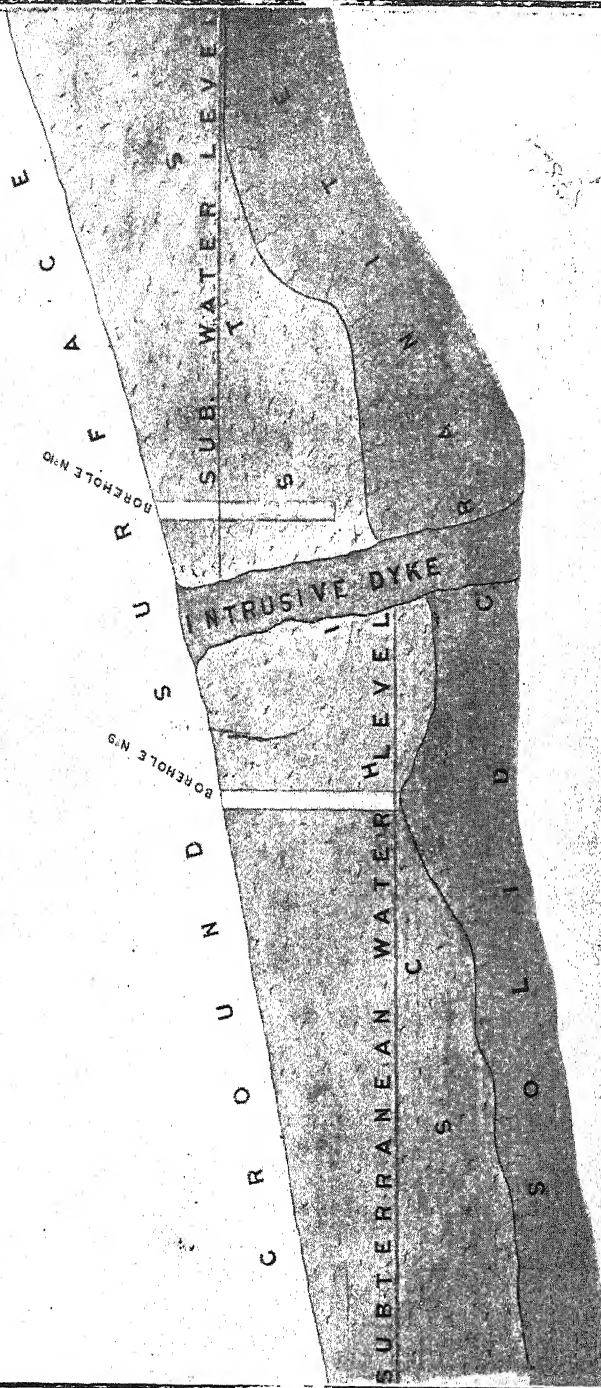
BOREHOLE No. 2

BOREHOLE No. 3

S K E T C H N^o 2

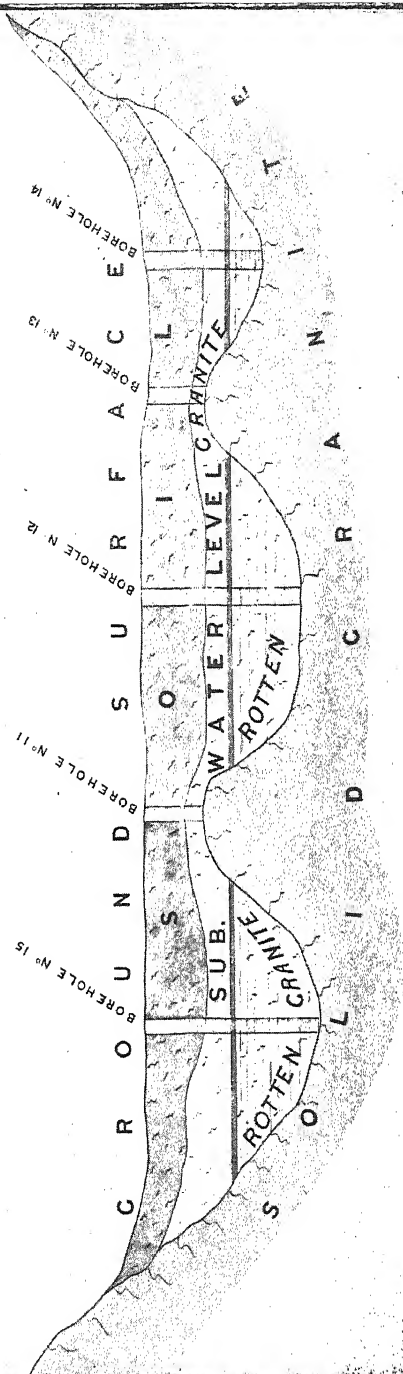


SKETCH N^o 4

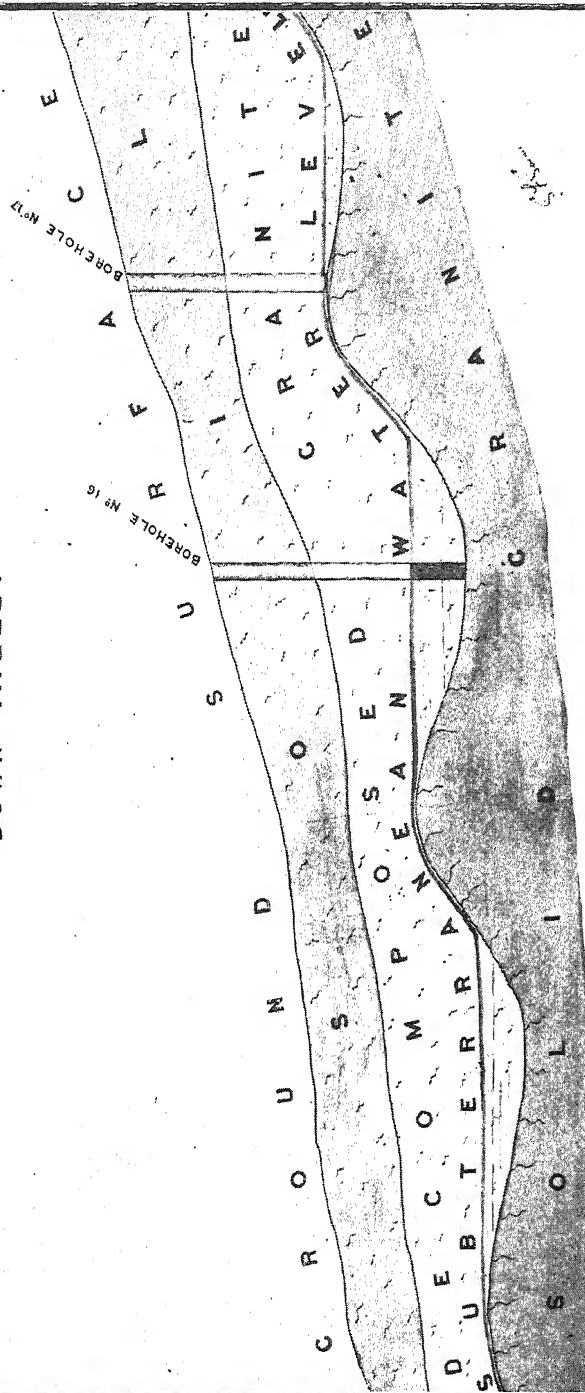


SKETCH N^o 5

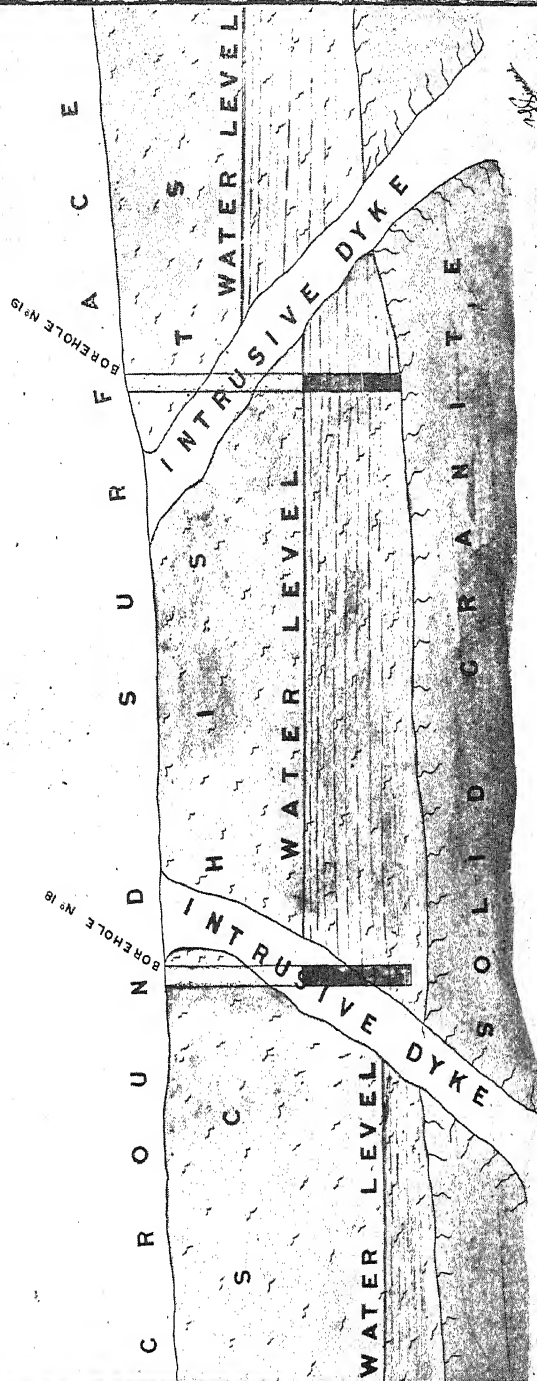
ACROSS VALLEY



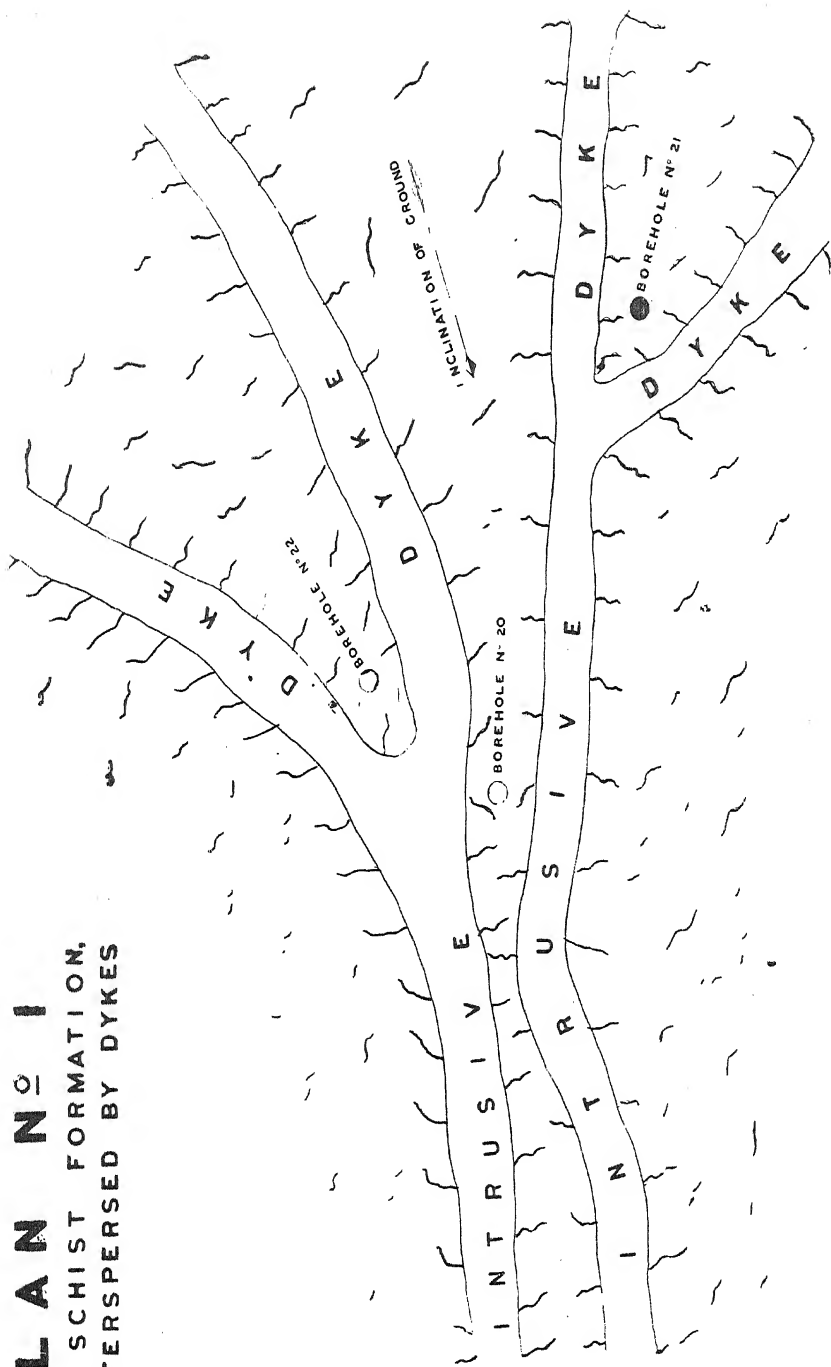
DOWN VALLEY



SKETCH N^o 7



PLAN N° 1
IN SCHIST FORMATION,
INTERPERSED BY DYKES



Another method of tapping subterranean water supplies is by tunnelling into hillsides by means of adits having a slight fall outwards, but as there is not much hope of this method being successful in Southern Rhodesia it need not be enlarged upon here.

In examining the accompanying sketches, it must be borne in mind that they are necessarily of an ideal nature. All intrusive dykes may not be solid, and if fissured they will not act as subterranean dam walls, as presumed in some of the diagrams.

Sketches Nos. 1 and 2 have been already explained in our remarks on artesian water supply.

Bore-hole No. 6 is shewn as having been stopped on the rotten granite; bore-hole No. 7, in the schists; and bore-hole No. 8, on the solid granite. By deepening bore-hole No. 8 the only advantage to be gained would be extra sumpage (or storage).

Sketch No. 4 illustrates the possible effects of a solid intrusive dyke passing through the granite and schist formations and the effects of the undulatory character that may be presumed exists in the solid granite, and emphasises the desirability of sinking at the upper side of any intrusive dyke which may make its appearance upon the surface of the ground.

Sketches Nos. 5 and 6 have already been referred to.

Sketch No. 7 illustrates the necessity of carefully examining the angle of dip of any intrusive dyke which may shew itself.

Plan No. 1 may act as a guide to farmers seeking for subterranean water in the schist formation where it is intersected by intrusive dykes.

Lectures on Agriculture.

A REVIEW OF THE COURSE.

The success attending the first attempt at a systematic course of instruction in agricultural science marks a forward step in the progress of the farming industry in Rhodesia. It had long been the intention to arrange such a course of lectures, but it had not been found possible before. That the time was ripe for the effort is shewn by the fact that upwards of seventy persons attended the lectures, whilst about twenty-five were present at the complete series. The object was, in the brief time available, to convey to the students some ideas of the scientific principles underlying the daily duties of farm routine, and to point out to them the lines on which they could afterwards at their leisure pursue those studies. To attempt to give anything like a complete course in the space of three weeks was out of the question: as it was, teachers and students alike were kept fully occupied in keeping pace with the programme in the time allotted.

The following were the subjects dealt with:—By the Director of Agriculture, cattle, their points, breeds and breed characteristics and management, the principles of cattle-breeding, State aid to the live stock industry, breeds and management of sheep; by the Chief Veterinary Surgeon, veterinary hygiene, discussion of the regulations governing outbreaks of contagious diseases, ox transport, movement and importation of live stock; by Mr. R. C. Simmons, management of dairy cattle, pigs, poultry, handling, making and marketing of milk, cream and butter, co-operation in the dairy industry, construction of dairies, sties and farm buildings; by Mr. Mundy, rotation of crops, cereals for summer and winter, new crops, tillage, artificial pastures, hay and hay-making, forestry; by Mr. Walters, maize, leguminous and root-crops, oil crops, ensilage; by Mr. Jack, insect pests of crops and fruit

trees, insects in relation to diseases of man and animals; by Mr. Blackshaw, the chemistry of farm crops, manures, farm foods, milk and its products, dips, disinfectants and insecticides; by Mr. Watt, measurement of water, canal irrigation, dams, application of water to land, subterranean water and the water laws of Rhodesia.

A summary of the lectures appeared in the daily press. Many of these subjects have been dealt with in the pages of this *Journal*, and these, along with others, will no doubt often be dealt with again in the same way. The publication *in extenso* of the lectures in these pages is, with certain exceptions, hardly appropriate, as the methods of oral exposition are as unsuited for purposes of publication as is the style of a written article to the public platform. Upwards of sixty lectures were delivered, and both at the opening and the close His Honour the Administrator addressed the students, whilst Earl Grey, Lady Grey and Lady Milton shewed their active interest by visiting the tent during the course.

At the opening of the lectures the Administrator said: "It was with very great pleasure that I accepted your invitation to be present at what is to me a very interesting occasion, and one which I feel is capable of great possibilities for the future. The idea of starting these lectures has been discussed by Dr. Nobbs, and brought forward by him, for some time, but it is only to-day that he has been able to bring his ideas to fruition. Agricultural education now in every part of the world is, I believe, considered to be a necessary adjunct to the Government of a country. In many countries very large sums are being spent. I remember Lord Grey, who still retains that intense interest in everything Rhodesian, and especially agriculture, which is always characteristic of him, wrote to me several times when he was Governor-General of Canada, telling me what they were doing there in the way of agricultural education. The first thing, apparently, in a new district is to build an hotel of course—(laughter)—and very soon after that follows a small school, and then, as soon as there is anything like a settled population, an agricultural school. (Hear, hear.) We in South Africa, south as well as north, have not been so aggressive in that policy as they are in these other countries, but I believe in all parts of South Africa the necessity for agri-

cultural education is now generally recognised. Our friend, Dr. Nobbs, himself was connected with one of the great institutions—the pioneer institution, I think—at the Cape in that way; and what Dr. Nobbs does not know about agricultural education I do not think that I can pretend to teach him. (Laughter.)

Very large sums are being spent in the south on this system, but of course we cannot pretend to compete in our present stage. I often wonder whether people consider what this country is doing in the way of agriculture, officially. You see large sums on the estimates in the Union of South Africa voted to agriculture and education. I think they total up something like £600,000 or £700,000 a year; but on examining these figures I find that that very large sum, as it appears, only represents 10s. or 11s. per head of the European population. Now, we in this country are spending—I think you will be surprised to hear it—£3 per head of the European population on agriculture and veterinary research. (Applause.) I think there is sometimes a want of sense of proportion when people complain that we are doing little that way, and that we ought to do more for the farming industry. We are a small population, a small number of taxpayers, and the Government has a great many calls upon it. Since Dr. Nobbs came he has not been backward, in office and out of office, in pressing the claims of his Department. (Hear, hear.) He has done this not only because it is his Department, but because he is convinced that the future of this land lies in its land. (Hear, hear.) And no one can say that he is wrong. There is, I feel sure, an immense future before the farming industry of this country, and it is the duty, as well as it is the wish of the Government, to foster that in every possible way.

Having said this, I will only say if we can by any means see our way to establish this course of lectures permanently, extended if necessary, and gradually lead up to what might be an agricultural university education, the Government will be only too pleased to do it. South Africa has been called the dumping ground for foreign produce in the past. There is no doubt that there is a great deal of justice in the reproach; but a great deal is being done now to alter that state of things. Year in and year out our friends the Director of Agriculture and the Collector of Customs have called attention publicly in

their reports --I do not know whether people read them--but they have called attention to these articles imported into the country which should properly be produced by the people who live in the country. In the south a tremendous effort has been made, and the last few years have seen enormous reductions in such imports as butter, eggs, cheese, and that sort of thing, and that is the mark we have to set before us; to try to appear as far as we can, self-supporting so far as the products of the soil are concerned. The object of these lectures, if I may hazard a suggestion, is an inducement to adopt up-to-date methods that are possible in order to increase your production. You must follow the latest and most up-to-date methods if you wish to become exporters of produce. You have enormous organised industries from other countries to compete with in the European markets, but the end of your endeavours should be to produce more than we require and export to foreign countries.

The Government is endeavouring with the railways to help you to place what surplus products you may have of the staples of the country upon the English markets at as cheap a rate as possible, to enable you to compete with the enormous amounts of produce which come in from Canada, the United States, and South America. I am pleased to see from a remark made in a speech at East London by the present Minister of Railways for the Union that the new mail contract is to contain very favourable clauses for exports in that respect. You may feel sure that although the contract is being negotiated with the Union, the Board of the Chartered Company will make an effort to secure all the advantages obtained by the Union for you. You may certainly rely upon that. (Applause.) There is another interesting statement made by the Prime Minister of the Union in a speech I saw lately, that the owners of the mail steamship line have agreed that all pedigree stock shall be imported free of freight. (Applause.) I do not know whether you have seen it. This is a very important thing indeed, because, as you all know, the freight on stock coming from Europe is a very considerable item. I happened to read that yesterday, or the day before, in a paper, and I believe it to be absolutely as I have stated: that Sir Owen Phillips, on behalf of the mail companies, has made it a clause in the contract that he will bring pedigree stock into the country free of charge. (Applause.)

You have before you a most varied and interesting syllabus, and I sincerely hope that the interest taken at the beginning will increase as the lectures go on, and that you will sustain it to the end. I went through the syllabus, and I found that there were no less than 57 or 58 lectures to be given to you on varied subjects. I think I may pay a small tribute to the expert officers of the establishment who have taken the trouble to prepare this very interesting series of lectures. I do not wish to detain you from that to which you are looking forward with intense interest and anticipation, that is, the first lecture by Dr. Nobbs, and I finally hope that the course of lectures may prove to be instructive and not unpleasant, and that in the future they may become an established feature in the system of the country, and that future assemblies may require—I will even go so far as to say—the Drill Hall for their scene. I have very much pleasure in declaring this series of lectures duly open.” (Applause.)

At the conclusion of the lectures Lady Milton very kindly distributed the prizes to the successful candidates, and on that occasion His Honour expressed himself as being very well pleased with the results of the course, more especially with the way in which interest had been maintained up to the end. He hoped in time to come it would be possible to arrange for lectures to be given in better surroundings than the tent which had served the purpose this year. He would like to express the thanks of all present to Dr. Nobbs and the staff of the Agricultural Department, who, at no little trouble to themselves, had given the lectures, which could not be considered as being strictly within the scope of their ordinary duties.

On several afternoons and on two Saturdays excursions were undertaken to farms in the neighbourhood of Salisbury, as well as to the tobacco warehouse, the brewery, the forest nursery, and the inoculation station. In all, eight leading farms were visited, and the crops, stock and buildings inspected. On these occasions much valuable information, beyond the power of books or lectures to impart, was gleaned. Examinations were held in the various subjects, and the students shewed by the general high merit of their papers that they were intelligently assimilating the instruction given, and utilising the opportunities afforded, thereby abundantly compensating their teachers for the trouble bestowed.

The first place over the whole course was taken by Mr. R. E. Downes, of Donnington, Makwiro, who accordingly gained the gold medal and also carried off first place and the prizes in four examinations. The second and third places were held respectively by Messrs. H. R. Martin and J. D. Lamb. Mr. Martin and Mr. G. E. Adamson secured two prizes each.

On the last day those attending the lectures entertained the lecturers and the farmers to whose farms excursions had been made, to a banquet, thereby testifying their appreciation and the good feeling which throughout had existed on all sides. The good numbers, regularity of attendance, and the interest maintained to the end have conclusively proved the demand which existed for the lectures, and warrant the hope that, an auspicious commencement having been made, such courses of instruction may become a permanent institution leading to greater things.

The Sugar Content of Maize Stalks.

(A Paper contributed to the South African Association for the Advancement of Science.)

By G. N. BLACKSHAW, B.Sc., F.C.S., Government
Agricultural Chemist.

In recent years much attention has been directed to the discovery of economic uses to which the maize plant may be put, other than those for which the crop is now cultivated. At the present day maize is grown more particularly for use as cattle food in the green state and in the form of ensilage, and for the production of grain which is chiefly employed as a feed for live stock, for the manufacture of commercial glucose and alcohol, and for human consumption in the shape of meal and refined products.

The institution of new markets for what is regarded as one of our staple products is surely a matter of vast importance to this country, and endeavours to extend the commercial possibilities of this great cereal will in time, it is hoped, be brought to a successful issue.

In a short paper dealing with the sugar content of maize stalks read at the meeting of this Association in Bulawayo last year, and which appeared in the March, 1912, issue of the *South African Journal of Science*, the writer pointed out that the idea of manufacturing sugar from the juice of maize stalks was by no means new; that in fact a factory was established in France about the year 1850, where large quantities of sugar were manufactured from this source, but that the project proved unsuccessful owing to the development of the beet sugar industry.

In the year 1881, Collier, who was then acting as Chemist to the United States Department of Agriculture, in a series of carefully conducted experiments on several varieties of maize, obtained the following results for maize stalk juice in which the specific gravity exceeded 1.055 :—

	Per cent.
Juice obtained	54.60
Sucrose in juice... ..	11.72
Glucose	2.27
Solids not sugar... ..	2.39

Number of analyses, 28.

Collier, in reporting upon his extensive investigations in this connection, drew attention to the erroneous idea, prevalent at the time, that the stalks of maize are dry and useless when the grain is ripe, and went on further to say that it seemed possible that the judicious use of the stalk would add greatly to the profit of the industry.

During the period in which Collier was conducting his experiments, the subject was being independently investigated in Pennsylvania by F. L. Stewart, who, as was pointed out in the previous paper on this subject, found that if the ears were removed whilst immature, the amount of sucrose in the juice increases, and also that stalks from which the ears have been removed remain green and vigorous for a longer period than the stalks bearing ripe corn.

Stewart has been working upon the subject for a number of years, and some time ago advanced the opinion that the maize plant could be economically used for the production of sugar, cellulose and alcohol simultaneously, the process being characterised by the complete utilisation of the plant—stalk, leaf and ear. Although figures are quoted which shew that the profit when the maize plant is so used far exceeds that at present obtained, Stewart states that the crop has not hitherto been utilised on a large scale for this purpose, for the reason that until recently his work in developing the different branches was not entirely completed.

With a view to determining the sugar content in the juice of stalks of Rhodesian grown maize, an experiment was conducted on a small scale last year. As pointed out at the time, the crop was very unsatisfactory for the purpose of the investigation owing to the lateness of planting and the heavy infestation of stalk-borers. The results were, however, interesting in that they afforded data in regard to the sugar content of stalks so infested.

During the season just completed, a more extensive series of experiments have been made for the purpose of investigating the sugar content of stalks of five varieties of maize, three of which are commonly grown in this country. The five varieties under trial were Hickory King, Salisbury White, Boone County, Golden Eagle and Sweet Corn.

The ground used for the experiment—a heavy red loam—was well prepared and kept in good tilth throughout the season. The maize was sown on 9th November, and all varieties making very good growth and being entirely free from insect attack, the plants were in every way suitable for the purpose of the investigation. From a portion of each plot, the ears were removed in a milky condition on 2nd April, and the juice of stalks selected from the cobbed and uncobbed portions analysed periodically until the crop reached maturity.

Methods of Analysis Employed.

One or more stalks of the variety to be examined were selected in the plot, and the juice submitted to analysis on the same day. The “stripped stalk” was weighed, cut into strips not more than half-an-inch in thickness, and the juice expressed under gradually increased pressure between the steel rollers of an ordinary flattening mill—the juice collected weighed and strained through a fine linen cloth. The *specific gravity* was determined with a “specific gravity bottle.” For the determination of *total solids* in the strained juice, 5 c.c. were introduced into a 2½-inch aluminium basin, the bottom of which was previously covered with coarse sand to ensure complete desiccation, evaporated to dryness on a water bath and kept at a temperature of 95 deg. until the weight became constant. For the determination of *sucrose* and *glucose*, 100 c.c. of

the juice were taken and defecated with basic lead acetate and alumina cream. In the filtrate from the lead precipitate, which was perfectly clear, the sucrose was determined by the polariscope method. In order to determine if any optically active constituent other than sucrose was present in *normal juice*, several determinations of the sucrose by cuprous precipitation before and after inversion, as well as by direct polarisation, were made; in every case the amount shewn by the different methods agreed very closely, indicating that sucrose was the only optically active substance present. For the determination of glucose, 60 c.c. of Fehling's solution were introduced into a 200 c.c. beaker, diluted to 100 c.c. with boiling water and heated to boiling by being placed in a vessel containing boiling water; 5 c.c. of the clear filtrate from the lead precipitate were then added, and the water in the outer vessel boiled for quarter of an hour. After decanting off the excess of Fehling's solution, the precipitated cuprous oxide was washed with well-boiled boiling water in a tared Gooch crucible and the crucible dried, strongly ignited and weighed. The weight of cupric oxide thus found, multiplied by .4535, gives the weight of glucose in the amount of clarified juice used.

The results obtained with the five varieties of maize were as follows :—

"A." Composition of the juice of stalks from which the ears were removed when in the milky condition. (2nd April, 1912.)

Variety.	Date Collected.	Number of days after the removal of cobs.	Juice, %	Specific Gravity.	Total Solids, %	Sucrose, %	Glucose, %	Solids not Sugar, %
Hickory King	April 11	9	55.6	1.064	15.60	11.27	2.39	1.94
	" 16	14	45.2	1.072	17.25	13.20	2.11	1.94
	" 24	22	50.6	1.066	16.04	12.52	1.55	1.97
	May 9	37	44.0	1.073	17.67	13.97	0.96	2.74
	" 15	43	48.9	1.065	15.90	11.28	1.49	3.13
Boone County	April 10	8	51.6	1.058	14.17	10.57	1.70	1.90
	" 15	13	47.6	1.065	16.15	11.43	2.94	1.78
	" 23	21	40.5	1.064	15.13	11.24	1.80	2.00
	May 8	36	51.9	1.072	17.70	13.62	1.06	3.02
	April 12	10	39.7	1.071	16.80	12.96	1.58	2.26
Salisbury White	" 16	14	40.3	1.069	16.91	12.79	1.40	2.72
	" 26	24	42.9	1.069	16.98	12.91	0.85	3.22
	May 10	38	45.6	1.069	16.87	13.75	0.90	3.22
	" 17	45	52.3	1.059	14.56	10.24	2.20	2.12
	" 23	51	42.7	1.067	16.40	12.07	1.01	3.32
Golden Eagle	April 12	10	40.9	1.062	15.53	11.22	1.96	2.35
	" 18	16	47.4	1.063	15.46	11.08	2.06	2.32
	May 2	30	48.2	1.063	15.63	11.27	1.37	2.99
	" 3	31	46.3	1.066	15.91	12.61	1.09	2.21
	" 13	41	40.5	1.059	14.69	9.77	2.20	2.72
Sweet Corn	" 22	50	43.0	1.069	16.95	11.82	1.41	3.72
	April 10	8	47.1	1.052	12.94	8.73	2.46	1.75
	" 15	13	48.5	1.054	15.00	9.42	1.75	3.83
	" 22	20	44.1	1.057	13.96	9.84	1.86	2.26
	May 7	35	51.0	1.069	16.87	12.69	1.10	3.08

"B." Composition of the juice of stalks on which the ears were allowed to mature.

Variety.	Date Collected.	Juice. %	Specific Gravity.	Total Solids. %	Sucrose. %	Glucose. %	Solids not Sugar. %
Hickory King	April 3	45.7	1.022	13.59	9.60	2.53	1.46
	" 4	43.8	1.034	13.43	9.58	1.90	1.95
	" 24	45.0	1.067	16.77	11.67	1.50	3.60
	May 9	44.3	1.059	14.39	10.94	0.72	2.73
	" 16	41.2	1.056	14.14	10.30	0.81	3.03
Boone County	" 20	48.4	1.046	11.47	8.08	2.20	1.19
	April 2	52.4	1.043	10.70	6.83	2.30	1.57
	" 23	53.9	1.055	13.45	10.29	1.80	1.36
	May 8	49.9	1.028	6.90	3.33	2.35	1.22
	April 9	43.7	1.056	14.11	10.49	1.72	1.90
Salisbury White	" 26	45.1	1.047	11.80	8.78	1.46	1.56
	May 10	42.4	1.038	9.30	6.82	0.55	1.93
	" 17	50.7	1.066	16.26	12.69	0.71	2.86
	" 23	44.9	1.050	12.00	8.67	1.19	2.14
	April 9	50.5	1.041	10.15	6.15	3.05	0.95
Golden Eagle	May 2	37.6	1.023	5.41	2.20	2.17	1.04
	" 3	44.5	1.030	7.72	4.34	1.86	1.52
	" 13	38.4	1.025	6.47	2.82	1.38	2.27
	April 2	46.9	1.050	13.73	8.49	2.69	2.55
Sweet Corn	" 22	43.9	1.053	12.99	9.67	1.34	1.98
	May 7	52.8	1.044	10.80	7.47	0.71	2.62

It is to be noted that :—

- (1) In the uncobbed plants examined the percentage amount of sucrose in the juice varied to a very great extent as the crop approached maturity.
- (2) That the sucrose content of the juice was much more uniform in the cobbled plants.
- (3) That the average amount of sucrose in the juice of stalks bearing cobs examined between 2nd and 9th April (excluding sweet corn) was 8.2 per cent., and the average amount in the juice of plants of the same varieties cobbled on 2nd April and examined between 10th and 12th April was 11.5 per cent., and that, therefore, in those plants from which the cobs had been removed the amount of sucrose increased considerably during the first eight or ten days after cobbing.
- (4) That the sweet corn variety gave the lowest results per acre for sucrose.
- (5) That in all cobbled plants examined between 10th April and 23rd May (eight to fifty-one days after removal of cobs), sweet corn excluded, the average sucrose content of the juice was 12 per cent.

In regard to the percentage amount of total solids recorded in the juice, it should be pointed out that a small amount of suspended matter was present, and that in consequence the "solids not sugar" percentage does not entirely consist of material in solution other than sucrose and glucose. It is to be noticed, however, that a close relationship exists between the specific gravity of the juice and the amount of total solids and sucrose present, indicating that the little suspended matter present in the samples examined was very uniform in quantity.

In order to obtain an estimate of the amount of sucrose contained in the juice of stalks of four varieties of maize grown locally per acre, treated as Stewart directs, the following

computation has been made from the data collected in this investigation :—

No. of stalks analysed (4 varieties).	Total weight of stalks. Pounds.	Average weight of stalks. Pounds.	Total weight of juice expressed from 22 stalks. Pounds.	Average percentage of juice expressed per stalk.
22	27·81	1·26	12·63	45·6

Assuming that the average sucrose content of the juice is 12 per cent., and taking the number of stalks per acre at 8,500, the amount of sucrose in the stalks per acre would be 585 lbs.

Assuming that the average glucose content of the juice is 1.65 per cent., the amount of glucose in stalks per acre would be 80 lbs.

8,500 plants per acre is a very liberal estimate in Rhodesia, where the crop is grown for grain production, but should the crop be grown for the production of sugar, cellulose and alcohol, thicker planting would very likely be possible.

Comparison of the Results obtained in Seasons 1910-11 and 1911-12.

In the few tests made in the season 1910-11, it was observed, firstly, that in no instance did a marked increase in the amount of sucrose present in the juice manifest itself as the length of time after the removal of the cob advanced; and, secondly, that no marked difference between the sugar content of cobbed and uncobbed plants was noticeable. As reported at the time, the condition of the crop was unsatisfactory owing to lateness of planting and insect attack, and consequently the results might have been influenced thereby. That such was the case seems certain from the results obtained during the season 1911-12, since the average sugar content of the cobbed plants examined this year, which were in all cases well grown and healthy, was much higher than in those plants on which the grain was allowed to mature. Whilst on this point I might say that there is reason to believe that the sucrose contents of the juice obtained from the top and bottom portions of the

stalk are not the same, and that the juice of the top half contains a higher percentage amount of sucrose than the bottom half. In other words, that the sucrose content of the juice is not uniform from the bottom to the top of the stalk. With a view to ascertaining if such was the case, *mature* stalks from which the cobs had been removed in the milky stage were roughly cut in half transversely, and the juice expressed from the top and bottom portions examined. In the three tests made, the difference between the sucrose content of the two portions varied from 2 to 4 per cent. in favour of the top half, but the percentage amount of juice expressed therefrom was much lower.

In conclusion, it should be pointed out that it is not Stewart's contention that the maize plant can be utilised more profitably for the production of cane sugar *only*, but that the three products—cane sugar, cellulose and alcohol—are producible simultaneously from the respective parts of the plant at a very much lower cost than from any other known source. Whether this statement applies in South Africa has still to be determined, and it was with a view to acquiring data upon the "sugar phase" of the question that this investigation was undertaken. That paper of good quality can be manufactured from maize stalks has long been recognised.

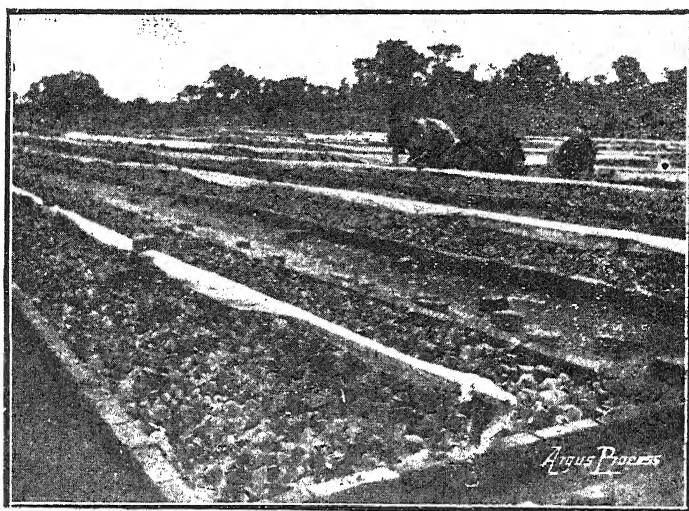
Tobacco Culture.

THE SEED BED.

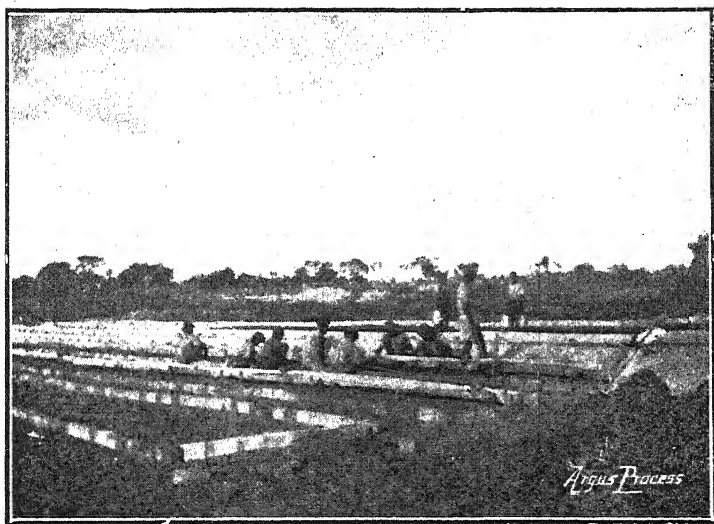
By the time these notes appear in print, the site of the seed bed should have been decided upon, and no doubt a number of growers will have already sown some seeds. Seeds should be sown in the latter part of September or early in October, and reserve beds sown each week thereafter until the rains set in. The necessity for this will be obvious, for it may be that sufficient rain to permit of planting-out will not have fallen until late in November, or perhaps well into December, by which time the early sown plants will be overgrown, and of no use for transplanting. Seed can be purchased at a moderate cost from the Tobacco Warehouse, Salisbury, and the Virginia varieties found by experience to be best suited to local conditions are Goldfinder, Hester, and Warne.

Advice was given in the August number of the *Journal* in regard to the selection of the site for the seed bed, the amount of seed to be sown, and the preparation of the seed beds; but we would again impress upon the prospective grower the importance of working the soil into a fine tilth before the seed is sown, and of getting the bed smooth and level, so that water cannot lodge on any part of it. The soil should be thoroughly manured—about 3 lbs. of fertiliser to each 10 square yards being applied. After being sown, the seed is not raked in, but the surface of the soil is lightly brushed with a broom. The sprinkling of the bed with an ordinary gardener's watering-can will in itself give sufficient covering. Tobacco seed that has been buried too deep will not germinate.

Before sowing, the surface of the seed bed should be thoroughly burnt to a depth of at least $\frac{1}{2}$ -inch in order to kill injurious insects and to destroy noxious weeds. Seed beds should be watered morning and evening until the plants are large enough to be planted out. Within two weeks from the time of sowing the plants will appear, and for some time they may not



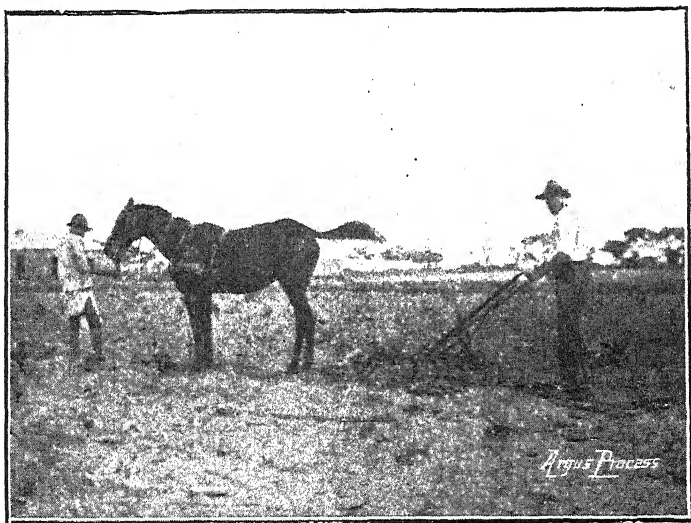
*Tobacco Seed Beds, Uplands, Marandellas.
Toughening the Plants to the sun, and Weeding.*



Tobacco Seed Beds, Uplands, Marandellas.



*Planting out Tobacco at Mr. C. B. St. Gwynne's Farm,
Nyanandhlovu.*



Cultivating Tobacco at Chudleigh, Marandellas.

appear to be making any growth. This is the period when, having exhausted the material stored in the seed, they are adapting themselves to the new conditions of life. When the plants are within a week or ten days of being ready for transplanting, the cloth covering should be removed every morning in order to toughen the plants to the sun, and be replaced at night to keep away moths. It may be taken as a guide that plants standing about 6 to 8 inches are ready for planting out, and they should be transplanted as early in November as the rains will permit.

Cut-worms are commonly very troublesome in the seed beds, especially if these are made in black soil in a vlei, where they are usually situated both on account of nearness to a water supply and in order to obtain plants with good root systems. In order to avoid loss in the seed beds it is necessary to make up one's mind that cut-worms are going to put in an appearance and to rid the seed beds and surrounding ground of the pest before the seed is sown. For this purpose a wide space should be cleared of vegetation around the beds. Unfortunately information is not available concerning the distance a cut-worm will travel over bare ground in search of food, but 20-30 yards should be the minimum distance from the ends and side of the outside beds that should be cleared. Before sowing, the whole cleared area should be thinly broadcasted with finely-chopped greenstuff wetted with the following poison :—

Arsenite of Soda 1 lb.

Treacle or Brown Sugar.. 8 lbs.

Water. 10 gallons.

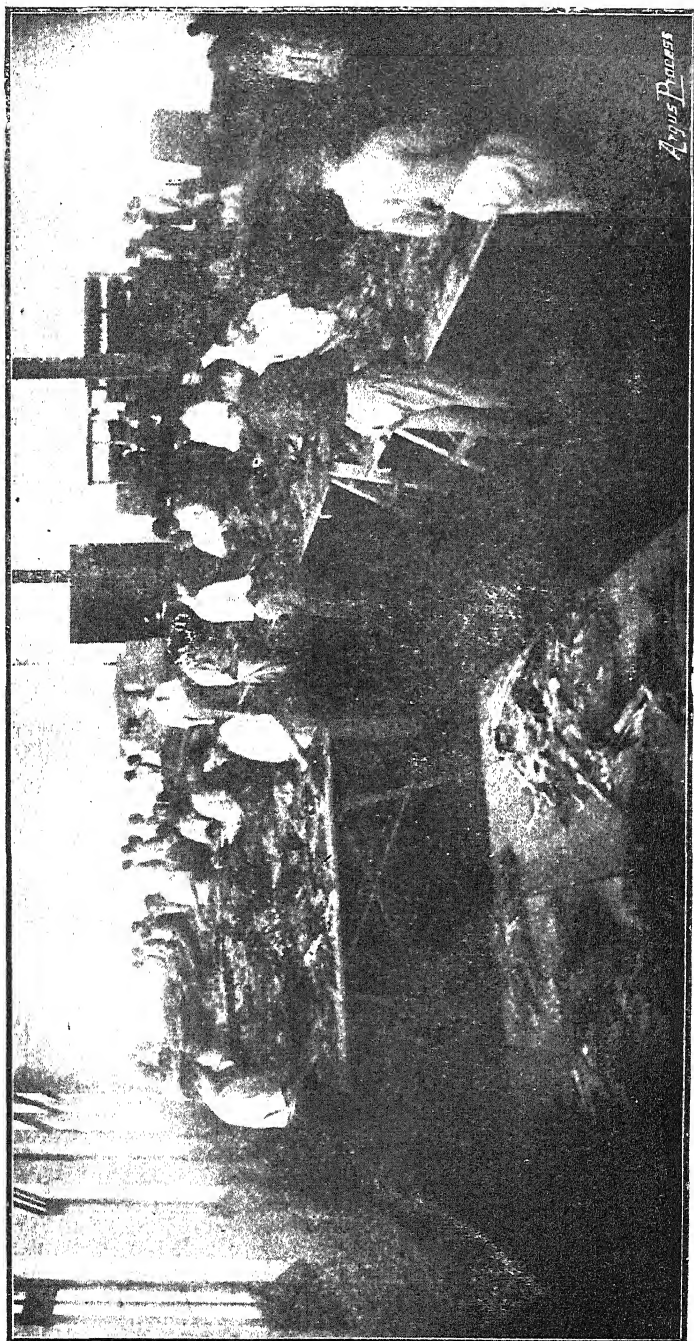
It will be found easiest to dissolve the arsenite in about a pint of boiling water, and then add it to the treacle or sugar solution. Arsenite of soda dissolves readily in hot water and but slowly in cold. The bait should be distributed about at evening, as the sun's heat would dry it up quickly, and probably lessen its efficacy. Two distributions of bait could advantageously be made before sowing. No advantage will be gained by applying the bait thickly, and on the beds themselves the bait would be undesirable, as it contains soluble arsenic, which might injure some of the young plants. If greenstuff is not available, bran or maize meal may be used to carry the poison, in which case the bait should be placed in half-tablespoonfuls about the ground.

The lands themselves may be cleared of cut-worms by the same methods, distributing the bait some days before planting out. Greenstuff should be used for baiting the lands, as maize meal involves expense. It should be quite easy to provide greenstuff in the form of lettuce, cabbage, carrot-tops, etc., by the time the planting season arrives.

We will now refer to the planting-out season, in which connection we have on several occasions impressed upon the grower the great importance of thoroughly breaking up the land and working the soil into a fine tilth. We have also before advocated ridging for growing the plants in preference to level cultivation, and we would repeat the advice now. Ridging saves time in planting out, and makes horse cultivation possible as soon as the plants shew signs of growth. Ridging prevents the plants from washing up or getting covered over with earth, while the fertiliser is also protected from being washed away.

Once more we would impress upon tobacco-growers the importance of frequent cultivation, beginning as soon as the plants commence to grow and continuing the work until the tobacco is ready to be topped. The last cultivation should be very thorough, and should throw more earth around the plant than any other. Horse cultivation is much cheaper than that performed by hand, and should be just as efficient if properly done.

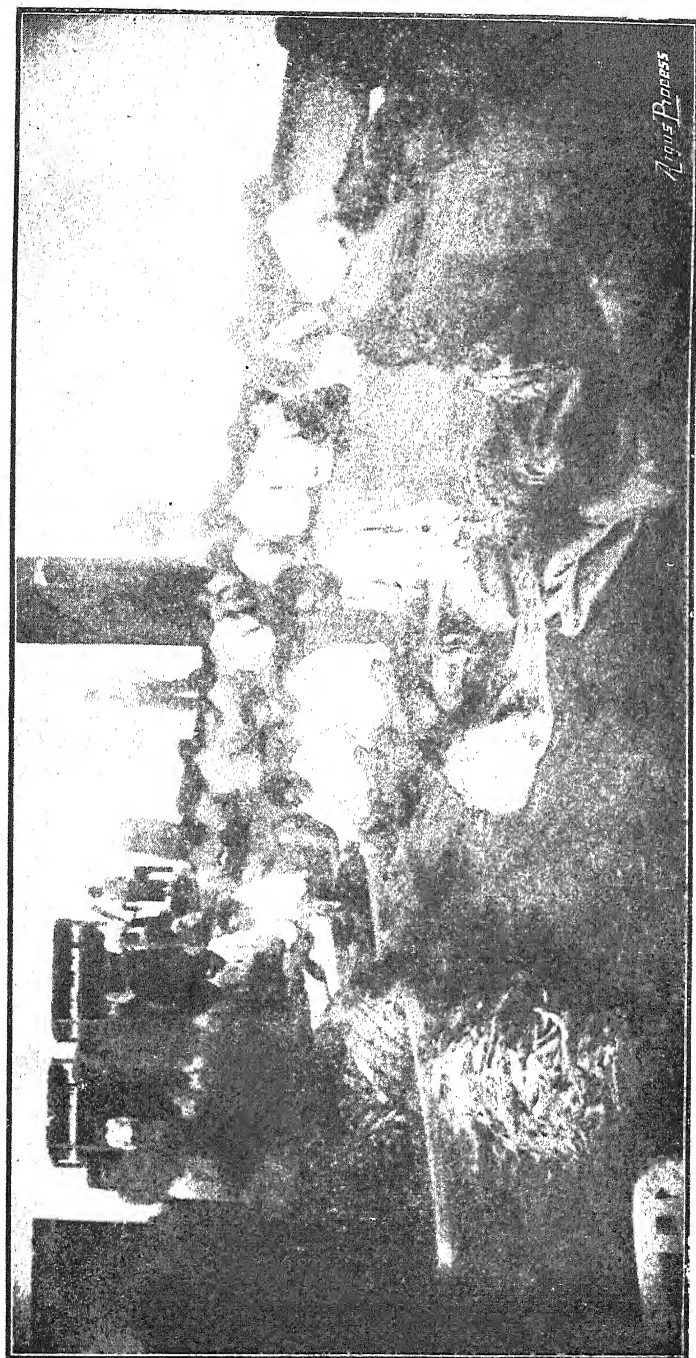
Several methods of applying fertilisers to the soil for the tobacco crop are in use. In the few cases where broadcasting over the land and drilling in the row have been tried immediately before setting out the plants, the results have been very satisfactory, and should future trials prove equally so, these methods will assuredly come into general use on account of the saving of labour when compared with the systems most commonly adopted at the present time, viz., placing the fertiliser on the surface round the plant, or in the holes prepared when the plants are set out. Kraal manure, while not recommended for bright tobacco soils, may be used with good results for the production of heavier types of pipe and chewing tobacco.



Argus Press

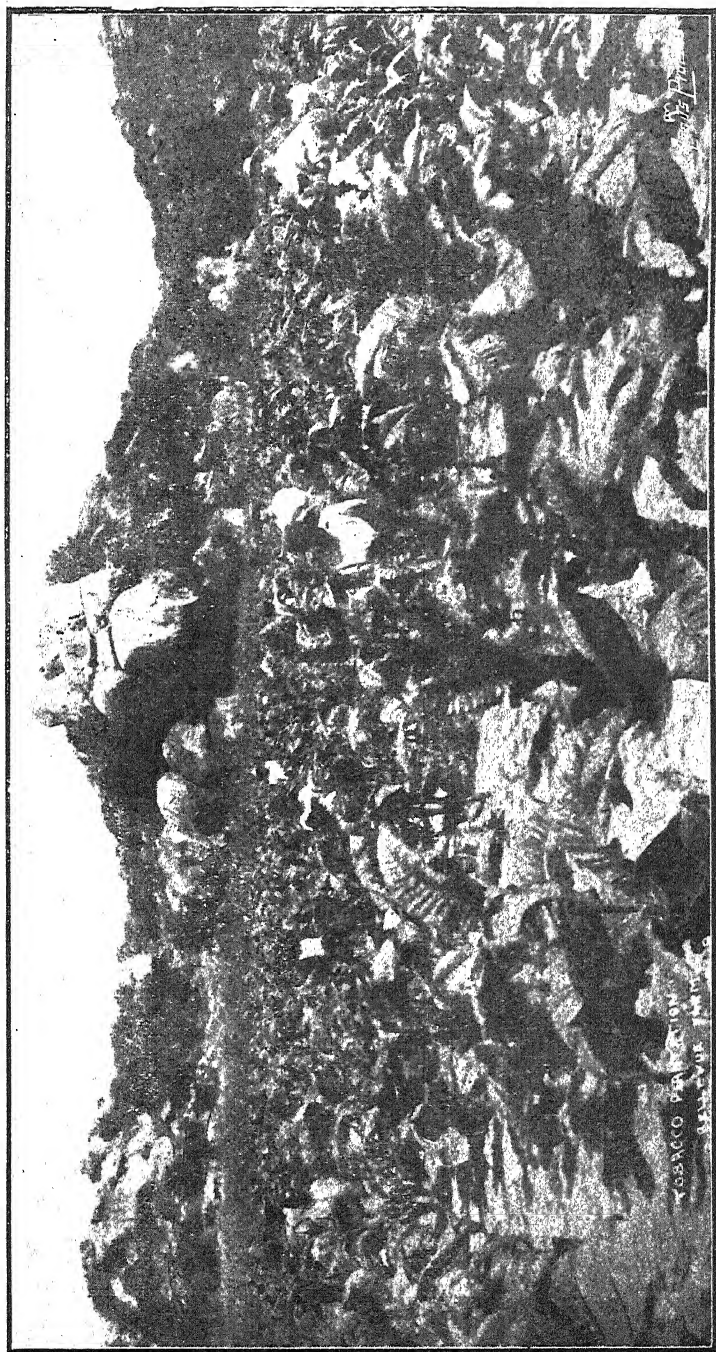
Tobacco Warehouse, Salisbury.

Natives Grading the Leaf.

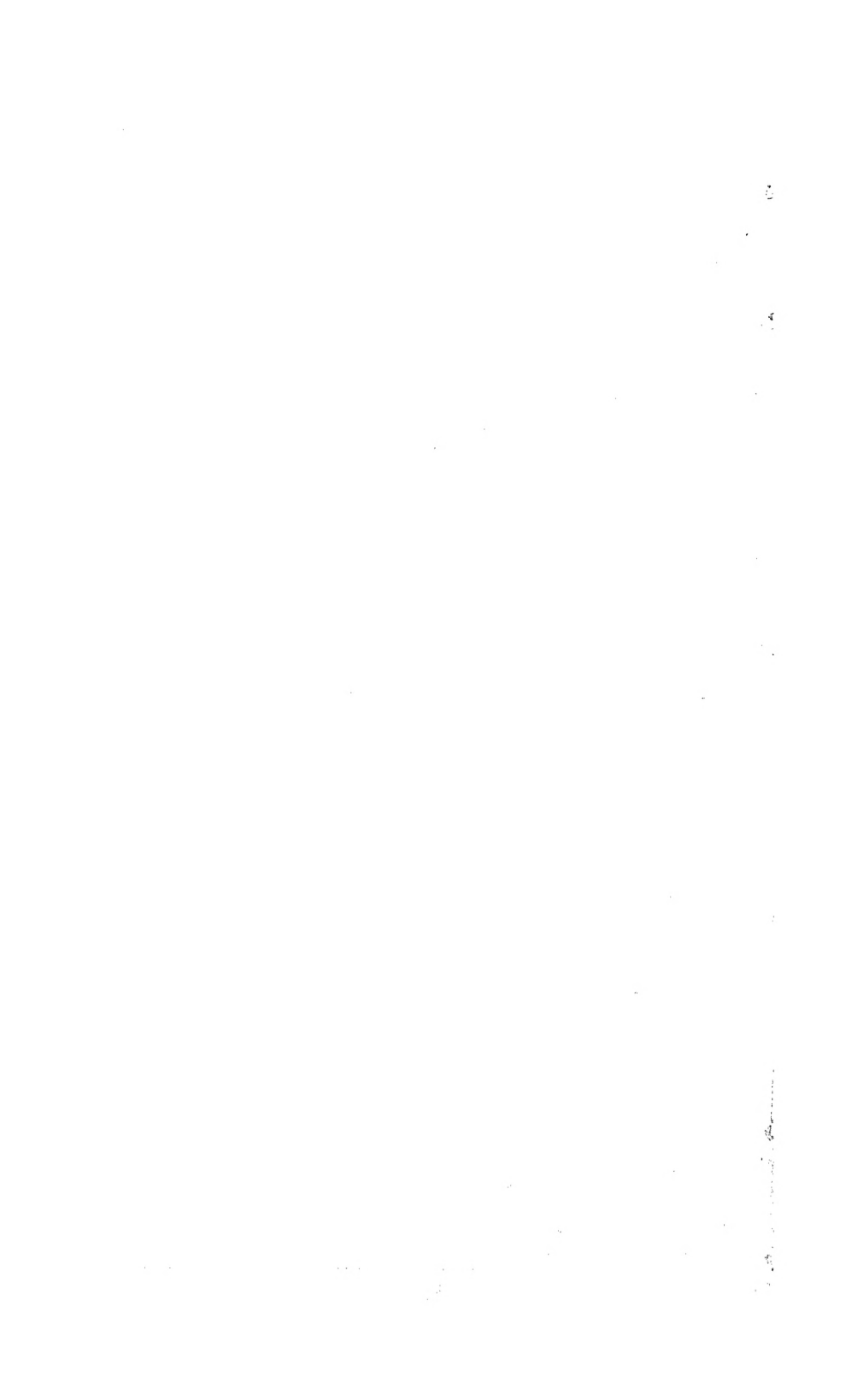


Agnes Press

*Tobacco Warehouse, Salisbury.
Natives tying the Tobacco into "Heads" after it has been Graded.*



Tobacco Plantation, Belleue Farm, Maunabo.



Turkish Tobacco.

Up to the present comparatively only a small quantity of Turkish tobacco has been grown in Rhodesia, but the successful results obtained with this type by certain growers has encouraged a number of planters of the Virginia type also to grow a small crop of Turkish, and the area devoted to this variety is gradually increasing. There is not the demand in South Africa for Turkish that there is for Virginia tobacco, but there is a ready market for a limited quantity of good class leaf, for which high prices are paid.

Many parts of Rhodesia are eminently suited to growing Turkish tobacco, and some of the leaf grown in the Territory has been very highly commented upon by experts in different countries: on the other hand, a certain quantity of the tobacco produced has been somewhat deficient in aroma. This might be remedied by growing the tobacco on slightly heavier soils than have hitherto been tried, and in this connection the remarks of Mr. Stewart Richardson, appearing in the June, 1912, number of the *Rhodesia Agricultural Journal*, are worthy of consideration. Experience in Rhodesia in regard to the culture of Turkish tobacco is as yet very limited, and the remarks contained in this article are only intended for a guide as to the general lines upon which the grower should proceed.

The Turkish seed which has been found to be most adaptable to local conditions is Cavalla, Xanthe and Baffara, which are supplied at a moderate charge by the Tobacco Warehouse, Salisbury.

Seed beds are set out in the same way as with Virginia tobacco, but in planting out the rows are made 18 inches apart only, while the plants are set 8 to 10 inches from each other. Constant cultivation is absolutely necessary, and, as the rows are close together, it is advisable that the work should be done by hand.

When the plant is about 18 inches high the bottom leaves should be removed, and as they are the worst leaves and not ripe they should be thrown away. Hitherto in Rhodesia Turkish tobacco has not been topped, but where it is grown on light soils it will be found efficacious to pinch off the *blossoms*: this will produce a leaf with more body in it. With tobacco grown on heavier soils this will not be found necessary.

When the leaf ripens a distinct change can be noticed in the colour, which then becomes a light yellowish green. The leaf also loses some of its crispness. If ripe, the leaf when plucked comes away clean at the butt, without any vascular fibres from the main stem adhering.

Harvesting is begun when the bottom leaves, or number one's as they are classed, are ripe. The numbers which refer to the position of the leaf on the plant are from one to five, the last being the small top leaves, which are the most valuable. Number two's are the largest leaves on the plant, and grow above the number one's. Number three's are the broad leaves above the two's and have more body and natural gum. Numbers four and five grow in order, decreasing in size and becoming thicker in body, and with more natural gum. Each reaping must be kept separate throughout the curing and baling processes.

Each boy reaps a single row of plants, the leaf being plucked between finger and thumb of the right hand by a side-ways motion. Each leaf is placed neatly above the previously plucked leaf, the pile of leaves being carried away in a basket. It will be found that neatness in keeping the leaves in pile as reaped will save much time when the leaves are threaded. The early morning is the best time to reap, the leaves then being crisp and easily broken from the stem. Reaping is never attempted after rain until the plants are thoroughly dry. Not more than four leaves at one time should be reaped from the plant, it being better to err on the side of reaping over-ripe than when the leaf is green, as the greenness will be difficult to eradicate. At the same time the leaf must not be too ripe, or it will lose its quality very quickly.

When as much leaf as can be sewn in a day is reaped, the baskets are taken to the sewing shed. At this stage the leaves

should be graded according to size. This is easily done and saves much subsequent labour. The needles for threading the leaf are about 16 inches long and about $\frac{1}{4}$ -inch wide, flat and smooth, with sharp points and blunt edges, and provided with eyes to thread the twine through.

The assorted leaves are threaded one by one on to the needles at a point about $\frac{1}{2}$ -inch from the butts, care being taken to keep the butts level. All leaves must face the same way and be packed closely together. The leaves are slipped on to the twine, and a stick about 4 feet long is laid along the string of threaded leaves: the ends are attached to the stick, and two or more bands are tied round the stick and threaded string to prevent the latter from sagging with the weight of the tobacco. All injured leaves should be sewn on separate sticks. The leaves should not be placed on the ground, as the gum causes sand to adhere to them and decreases the value of the tobacco.

Sun-curing or air-curing has been found more suitable than flue-curing with Turkish tobacco in this country. The threaded sticks are taken to a dark shed, free from draughts, and suspended close together on racks formed of two rails 5 ft. apart, or on wire stretched tight. The sticks must be examined daily, and should there be much moisture, they must be spaced apart, or they will blacken and rot. As soon as it is seen that the majority of the leaves have changed to a yellowish green colour they are removed to the drying racks.

Drying racks are made by stretching wires about 2 feet 6 inches to 3 feet from the ground on uprights spaced 4 feet apart. The wires should be 5 feet apart, which allows for 6 inches projection of the tobacco sticks on either side. Four lines of wires are usually placed side by side, the middle space being 1 foot 6 inches, where the upright poles are placed, which carry the skeleton shed of light rods to support the sails for protecting the tobacco from the weather. The length of these racks is made to suit the size of the covering sails.

Some growers at first place the sticks close together, but not touching, and later gradually increase the distance apart, the object of varying the spaces being to regulate the drying of the leaf, so that the yellow colour may be retained. Others

place the sticks about 4 inches apart, and keep the sails down for the first day. The leaves are allowed to hang on the racks until the mid-ribs are dry, a period varying with weather conditions. The sticks are now taken off the racks and laid flat on clean grass-covered ground. At night they are covered with grass or buck-sails to keep off the dew. On the following morning the sticks are turned, the reverse side of the tobacco being exposed to the sun. This process is continued for a day or two until the green shade is no longer seen in the tobacco. Should the tobacco remain green it may be finely sprayed with water in the evening, the object being to brown the leaf. The other side is sprayed next evening.

In order to get the leaf sufficiently limp for baling, some growers make covered-in pits, in which the tobacco is hung for 12 to 24 hours. The cellars are usually made about 8 or 10 feet broad and about 8 feet deep, racks being fixed upon which to hang the sticks.

The tobacco is now removed to the storehouse. There are several methods of storing the leaf, viz. :—

- (1) The sticks are removed and the strings knotted at the ends to prevent the tobacco slipping off. Five or six strings are then tied together at one end and are suspended from nails driven into rafters or rails across the shed.
- (2) The sticks are placed flat on a boarded floor, one stick being laid on the tobacco of the next, thus binding the bulk, which is stacked as high as can be done with convenience.
- (3) The sticks are removed and the ends of the strings having been knotted, the tobacco is stacked in bulks.

The latter is probably the best method, as retaining the sticks in the bulks tends to breakage, while tobacco hung up does not mature and improve in so great a degree as when put into bulks.

When bulking tobacco great care must be taken that there is not too much moisture in the leaf, or the bulks will

start heating and spoil. Should the least sign of heating be noticed the bulk must be at once pulled apart, aired and re-bulked.

When the leaf is in a condition to be handled the strings are straightened out neatly, each leaf being put in its place, and the strings are cut to the length of the baling-box, the ends being knotted to prevent the leaves slipping off. As the tobacco is already graded as regards number and size, it only remains to grade as to colour, the boys putting strings of similar colour together until there is sufficient to make a bale.

The strings of tobacco are placed in the baling press with the butts outwards and tips to the centre, two layers of tobacco being placed on the outside to one on the inside strings. The number of strings in one layer varies with the size of the leaf. Neatness in baling is soon learnt after a little practice. The average weight of a bale is 80 lbs., but this varies greatly with the number and condition of the leaf.

When the bale is pressed it is removed and stitched up in canvas round top, bottom and one end, the canvas being laced together with strong string. The advantage of this is that the bales can be examined at any time. This should be done frequently after baling to ascertain if the leaf is in good condition. Should there be signs of too much moisture or any heat, the bale is set up on end, all the lacing strings having been loosened and the tobacco strings are separated, so that air may reach the interior of the bale, the bales being turned daily. When the leaf has sufficiently dried the bale is again laced.

Cigar Leaf Experiments.

HINTS TO GROWERS.

Numerous applications have been received for the cigar seed which the Department of Agriculture is distributing for experimental purposes, and quite a large quantity of seed has been sent out. The only variety in stock at the time of writing is Sumatra seed, of which there is still a fair amount available. The response to the notice issued in the last number of the *Agricultural Journal* is quite encouraging, and it is to be hoped that by the end of the season we shall have some valuable data in regard to this type of leaf to work upon. Growers are again requested to give the seed a fair trial, and to carefully note and record the various stages in the growth of the plants. Growers are also particularly advised to save some of the seed from the plants reared to sow again next season in order to see whether the seed breeds true to type.

In America some growers of fine cigar wrappers import seed from the best Vuelta districts of Cuba and grow it for four years in succession before saving seed for crop purposes, and then succeed in raising a uniform article year after year. Crops there are never raised from freshly imported seed, because several years are necessary to thoroughly acclimatise the plant. It is true that soil and climate gradually change the size and fragrance of the leaf, but this, it is claimed, does not necessarily lessen the quality of the leaf for wrappers if proper attention is paid to raising and selecting seed.

The most difficult kind of tobacco to produce in perfection is the leaf used in the manufacture of cigars of the finest quality. There is some difference of opinion as to which is the best leaf for wrappers, but the Sumatra stands very high in the popular fancy, because it is so light that but two pounds are required to wrap 1,000 cigars.

On the matter of quality in tobacco for wrappers and binders, Killebrew says :—“There are almost as many ideas about what constitutes quality as there are dealers in leaf, manufacturers of cigars, or smokers. At the present time, and for several years past, qualities upon which all are agreed as desirable are : A leaf of light colour, free from spots, light in weight, fine in texture, containing few and small veins and mid-ribs, so that it will cut into wrappers with as little waste as possible. The leaf must also have good burning qualities, holding fire a reasonable length of time and burning with a white ash, and so that the ash will hold the form of the cigar until knocked off by the smoker. All manufacturers and cigar-makers want a leaf that is not brittle, that is smooth, elastic and supple, yet not tough.”

A warm, deep sandy loam, having a permeable sub-soil, is generally considered most suitable for cigar leaf. Only light wrappers of thin texture are now in demand, and to produce these the soil must not be heavy. An essential point is that the soil shall be free from standing water and susceptible of early and late cultivation.

In the August number of the *Agricultural Journal* we gave a general outline as to the methods to be adopted in sowing and planting out, and later on we hope to publish notes in regard to the treatment of the crop in the field, harvesting and curing. Meanwhile it may be well to advise uninitiated growers as to the best method of raising cigar seed. Killebrew says :—“The best way to secure a perfect leaf is to grow the seed plants in an isolated place, removed at least a mile from any other field of tobacco. There must be several plants near each other, so that the pollen may be interchanged between the flowers of the different plants. In turning out plants for seed, the earliest, the healthiest and most vigorous growers should be selected. The plants selected should be as nearly perfect as possible, the stalks firm, and the leaves near together on the stalk. The leaves should be perfect in size, shape and texture, with small mid-ribs and veins. When the plant blossoms, carefully and frequently remove all suckers and side shoots, leaving only the large clusters of flowers at the top to produce seed ; also remove two or three of the upper leaves to prevent the plant becoming top-heavy. If the weather is windy and the plant liable to lean, drive a lath near the plant and tie the stalk to it. When

it has developed a good head and the earliest seed pods begin to turn brown, pinch off all remaining blossoms and small seed pods, and continue to do so if any blossoms appear later on. The ideal seed would be taken from the central cluster of capsules of a well-developed and carefully selected plant. A smaller quantity of seed will be obtained, but it will be plump and healthy. The great object is to force all the strength of the plant into the production of a limited quantity of very nice seed, and great care should be taken to keep the plant growing vigorously until this is attained. When the seed is ripe, which is shewn by the seed pods turning brown, cut off the head with about a foot of the stalk attached and hang in a warm, dry chamber. When the bulbs and stalks are entirely dry remove the bulb shell from the seed and carefully winnow it until the chaff and all the lightest seed are removed. Some, however, do not shell the seed until wanted, claiming that it keeps better in the pod; in which case the pods, when dried, are picked and placed in a flour sack or pasteboard box and kept in a warm place until the seed is wanted for planting, when the quantity required is shelled."

The Utilisation of Waste Tobacco.

By G. N. BLACKSHAW, B.Sc., F.C.S., Government
Agricultural Chemist.

Suggestions have repeatedly been made that the refuse from our tobacco fields, barns and factories might profitably be utilised in the preparation of nicotin for use as an insecticide or dip.

Waste tobacco is made up of tobacco dust—leaf unfit for smoking and mid-ribs. In America and Europe the waste leaf, etc., chiefly used in the preparation of tobacco extract is a coarse, low quality Virginia or Kentucky leaf, containing about 4 per cent. nicotin—the active principle—and the standard extract contains 8 to 9 per cent. of this constituent.

Since the cost of producing extract for insecticidal purposes increases considerably as the nicotin content of the raw material diminishes, it has not been found profitable to use waste of low nicotin content; consequently it is necessary that a comparison be made between the nicotin content of locally grown tobacco and that usually employed abroad.

Lundie, in a paper read before the Bulawayo meeting of the South African Association for the Advancement of Science, quoted the following figures as being the average nicotin content of a number of samples of Rhodesian grown tobacco.

Virginia leaf (Hester), flue cured...	2.14 per cent. Nicotin
Turkish leaf... ..	2.52 per cent. Nicotin

McCrae in 1905 stated that the average percentage amount of nicotin in Transvaal tobacco was about 2 per cent.

For the preparation of tobacco extract these figures are so low that the prospect of competing with the imported article is not encouraging.

Whilst it is doubtless possible to produce a coarse tobacco of high nicotin content in Rhodesia, the bulk of the tobacco waste in this country at the present time is obtained from cigarette leaf and lighter qualities of pipe leaf, and not from very coarse material. The natural inference is, therefore, that the percentage amount of nicotin in the waste is low.

Taking Lundie's figures for Rhodesian leaf, and assuming that 1 gallon of water added to tobacco yields 1 gallon of extract (*i.e.*, no change in volume), to produce 1 gallon of extract containing 8 per cent. nicotin (weight of extract per gallon, 13½ lbs.) will require :—

$$\frac{13\frac{1}{2} \times 8}{100} \times \frac{100}{2.14} = 50 \text{ lbs. Rhodesian Virginia leaf}$$

and

$$\frac{13\frac{1}{2} \times 8}{100} \times \frac{100}{2.52} = 42 \text{ lbs. Rhodesian Turkish leaf}$$

The present price of reliable tobacco extract in Salisbury is 12/6 per gallon. *Making no allowance for cost of manufacture and marketing*, the value of local leaf for the manufacture of extract would therefore be :—

$$\frac{12/6}{50} = 3\text{d. per lb. for Rhodesian Virginia leaf}$$

and

$$\frac{12/6}{42} = 3\frac{1}{2}\text{d. per lb. for Rhodesian Turkish leaf}$$

Scrap at the tobacco sale held in Salisbury last January realised 3d. to 3½d. per lb., so that at the present time the commercial prospect of using waste tobacco for the preparation of tobacco extract is not promising.

It is possible that the waste could be used for the preparation of home-made sheep dip, using one and a half or twice the amount of tobacco recommended in the usual formulae.

As tobacco is a gross feeder and the stems are particularly rich in nitrogen and potash in readily available forms, it is good practice to return them to the soil as a manure rather than use them for the preparation of tobacco extract.

Notes on the Building of Farm Homesteads.

By R. C. SIMMONS.

The progressive farmer, especially the dairy farmer, cannot carry on his business economically without buildings which are properly constructed and arranged.

During the earlier stages of the occupation of a farm one usually has to make shift with pole and dagga huts, bucksails, and so on, but it will be generally agreed that proper and adequate buildings are, in the end, an enormous economy of time and money.

In order that the greatest saving of time and labour may be effected for a given expenditure, the buildings must be planned in accordance with the teaching of experience. The old system of building the stable here and the granary there without thought of their relation one to the other is extravagant, to say nothing of the ragged appearance which it gives to the homestead.

So soon as the farmer has been on his farm long enough to select with certainty the best spot on which to build, and so soon as he is able to begin putting up permanent structures, he should adopt a plan or system of building which will hold good more or less for all the additions he is likely to make to his homestead, no matter how small a portion he may be able to afford as a commencement, or how little at a time he may be able to add.

Let us suppose, for instance, that a farmer, having been a year or two on his farm, decides to go in for dairy cattle on a small scale with a view to supplying milk and butter.

He will perhaps start with about 20 better class heifers and a good bull. He will require a shed in which to milk them in a proper and cleanly manner, and in which to feed them in winter. At the time he will probably be able to afford only just sufficient shedding for the 20 heifers, but he hopes to increase his business and eventually to milk 40 or 50 cows, according to the capacity of his farm, which will involve more shedding and various subsidiary buildings. The plan reproduced, besides giving various dimensions which it is hoped will be of service to farmers, will serve to illustrate the method by which one can build in sections as the various necessities arise or the means become available, and yet ensure the completed homestead being compact, neat and economically constructed.

With the purchase of the 20 heifers, the farmer may commence by erecting the buildings marked Nos. 1, 2 and 3, which will all be built on the lean-to principle against a 9-inch brick wall, 4 to 5, the cowshed portion being open and the two ends bricked up to make the feed-house and bull-box.

With such a small number of cattle perhaps a special feed-house is hardly necessary, so this apartment may, if desired, be used as a tool-house, calf-house, or forage store.

In the course of erection of the foregoing, two doorways (Nos. 6 and 7) should be built, but temporarily bricked up, in the feed-house No. 1 and the wall of the cowshed No. 2.

The time having arrived when the farmer wishes to increase his herd, he naturally requires more stable room. All that is necessary is to erect another lean-to building on the back of the wall 4 to 5, which can be fitted throughout its length as a cowshed, similar to cowshed No. 2, with the feed-passage next the wall, or it can be arranged partly as a cowshed (No. 8) and partly as a cart-house or forage store (No. 9).

A fenced yard in front of this, or such portion of it as is utilised as a cowshed will probably be found convenient.

When this addition is made the bricks which have been temporarily filling in the doorway (No. 7) may be knocked out, and it will be seen that the whole range of cow-shedding

and the bull-box are within easy reach of the feed-house, and that all the animals may be fed with a minimum of labour.

In any variation of this plan which may be adopted all houses in which animals are to be fed should be easily accessible from the feed-house, and in this connection it should be remembered that overhead feed-trolleys are easily erected and will greatly minimise the labour of putting the feed in the mangers.

About this time the farmer will want increased accommodation for his calves. It can easily be provided by adding a calf-house at right angles to the buildings Nos. 1, 2 and 3, and adjoining the feed-house (No. 1), with which it also will communicate direct by the doorway (No. 6) which was built in the first instance. This last building can be added with very little alteration to the original roofing and practically none to the original brickwork.

And so the mule stable, granary and other buildings may be added in the same manner, eventually forming a hollow square, which is really the principal feature of the whole system.

By building in the form of a hollow square not only are the various buildings brought into close proximity with one another and much time and labour thus saved, but the square itself forms a sheltered yard, thus economising space and material.

Another advantage of this system of building, in addition to the enormous amount of extra shelter which is obtained, is that it can be continued practically indefinitely by adding square to square—when the first square is complete, for instance, another one may be commenced to face cowshed No. 8—and yet all the various sheds and buildings will be compact and in a convenient relative position to one another.

It is within the writer's knowledge that one of the most convenient and up-to-date stud farm homesteads in the South of England has been built up in this way during a period of over 50 years, piece by piece, and without any destruction whatever.

It should be clearly understood that the plan reproduced is shewn as an example of a system only, and may require modification in many ways to suit the requirements of the individual farmer on the site on which it is proposed to build; at the same time it is recommended as a very useful model.

The cowshed, it will be noted, is built without divisions between the cows. The division shewn in the elevation of the section C D is merely the one dividing the cows from the passage-way. The dimensions given of the height and internal fittings are confidently recommended, and if divisions are required 3 ft. 6 in. should be allowed per cow, whether in single or double stalls. Similarly if it is required to increase the accommodation, 3 ft. 6 in. per cow should be allowed.

It will be noticed that the feed-passage is continued through the bull-box, thus making it easily available for extra cows if desired.

The manger is a plain one of galvanised iron sheeting on wood 1 ft. 6 in. high in front, with a rail at the back about 4 ft. from the ground to prevent animals getting over into the feeding passage.

The cheapest method of tying cows is by reins to rings in the front of the manger.

Until the farmer can afford cement or brick flooring an ordinary gravel or stone rubble bottom will suffice. Modern floors and more elaborate tying-up arrangements can always be put in when convenient.

The lean-to covered way for a wagon is a good idea, and may be utilised for housing small implements such as cultivators and the like, and still leave room for a wagon to draw under. Its position near the granary renders it especially useful.

There is no reason why pig-sties should not be included in the general block of buildings, but they may, perhaps, in some instances, be more convenient near the paddocks or lands in which it is intended the pigs shall graze.

The dairy should be situated at least 50 yards from any cattle-sheds or the general block of buildings, and should, in

its simplest form, consist of a brick building, say 14 ft. square, with double walls 9 inches outside, $4\frac{1}{2}$ inches inside, with a $4\frac{1}{2}$ inch dead air-space between. The roof should be thatched and ceiled either with boards or calico. The verandah should be wide enough to completely shelter the walls from the sun. The windows should have double casements to complete the dead air-space, and the floor should be cement with a shallow open drain, taking all water clear outside the building.

It is hoped to deal more particularly with these last two items separately at some future time.

In conclusion, it should be remembered that in laying out the foundations of such a homestead as the foregoing they should be so placed, having regard to prevalent winds, rain quarter and midday sun, that the greatest amount of shelter is obtained by means of the yard and open shed.

If possible, the cart or implement shed should face south or east.

The hot sun shining into the cowshed in the middle of the day is not an objection.

Arsenical Poisoning.

The following report by Assistant Veterinary Surgeon Pinchin, Bulawayo, is published in order to draw the attention of cattle-owners and others to the loss which may occur through the careless handling of arsenical preparations, whether in the form of cattle or sheep dip or otherwise. Had these cases occurred in cattle, the dipping-tank would certainly have been blamed :—

“On 10th July I made a *post-mortem* examination of two donkeys and one mule in a yard in Bulawayo. The three animals had been noticed ill a few hours before death, which occurred about the same time, viz., between 8 and 9 o'clock that morning. Three other animals, two donkeys and one mule, were alive on the premises. One of the donkeys appeared to be ill and in some pain.

“Examination of the three carcasses shewed very acute inflammation of the bowels and to some extent of the stomach, these organs also shewing on the mucous surfaces numbers of small hæmorrhagic areas, such as would result from the deposit of a solid irritant. The circumstances and appearances as a whole pointed very strongly to the cause of death being a strong irritant mineral poison taken in the powder form, and most probably arsenic. The owner stated that he had no arsenic or other poison on the premises, but later on an empty tin which had contained arsenic was found. It subsequently transpired that about four years ago he purchased some arsenic for the purpose of destroying white ants, which he mixed with some chaff and placed in a tin. When cleaning up the store shed this mixture of arsenic and chaff was thrown out and the boys collected the chaff with other hay and gave it to the mules and donkeys.”

Simultaneously with the above, a farmer in the Insiza district forwarded to the Department of Agriculture, Salisbury, the stomach of a valuable sow, together with the roots of water-lilies upon which his pigs had been feeding, and to which he attributed his loss. The plants in question are quite harmless in character, but chemical examination of the ingesta revealed clearly the presence of arsenic in quantity quite sufficient to cause death.

Paspalum.

By J. A. T. WALTERS, B.A., Assistant Agriculturist and Botanist.

It is not many years ago since paspalum was introduced into South Africa. As a winter pasture plant of the first order it has long been known in Australia. It was not long before it passed through the experimental stage and established itself under the climatic conditions obtaining in Natal and the Cape, where it proved to be of exceptional value in supplementing the natural grazing afforded by the veld, and whence it soon spread northwards. Its introduction into Rhodesia by the Department of Agriculture was a natural outcome of the need in this country for some form of plant food which would remain green in winter, and provide animals with a succulent, nutritious food. A winter pasture plant was required which would assist the farmers in the serious task of providing winter feeding for their cattle.

It is not claimed for paspalum that it is the best of all winter fodder plants. Lucerne is in many ways superior, and tall fescue is known to remain green right through the winter, and to be a first class fodder plant when planted on moist black soils. Experiments with this latter grass seem to shew that the sandy and red soils of Rhodesia are not well adapted to it. Paspalum, on the contrary, thrives in most classes of soil, and when planted in fairly rich moist soils gives an abundance of green growth unsurpassed by any of the native plants.

As a rule grasses are not very deep rooted; and there are but a few of them which conserve moisture and plant food in their roots. Paspalum is neither deep rooted nor bulbous-rooted, and the power of producing green shoots early in spring or immediately after a winter veld fire is due to its power of storing much moisture and food in that portion of the stem which is underground. In the Transvaal, where the winter drought and frost wipe away all traces of green from the paspalum plants, the sheep have learned to search for this whitish underground portion of the stem and feed on it when nothing else is available.

Paspalum is a native of Brazil, and is a perennial grass which requires much moisture for its growth. It does better in damp situations than in dry ones. Its chief value to the Rhodesian farmer, however, is due to the fact that in spite of this it will stand the rigours of winter, and even in the coldest parts is later than any of the natural veld grasses in autumn and earlier in spring. On granite soil, where there is some moisture at no great distance from the surface, *new growth* on paspalum plants *up to 8 inches long* appeared in the first week of September of the present year.

The early appearance of green leaf before there is any rainfall is due to the reserve of food material mentioned above. If a paspalum root be dug up in winter and one of the root slips be examined it will be found to consist of dry brown sheaths surrounding a whitish portion of the main stem several inches long. This whitish stem is very succulent, and contains a large reserve of food material. Warm weather impels growth, and provided the frosts at night are not sufficiently severe to kill the young shoots, considerable progress is soon made. It frequently happens, if there is a temporary respite from frost in midwinter, that paspalum will make a growth of a few inches which will be cut down again by a later frost. Generally speaking, paspalum will remain green through the winter in localities where frost is not very severe. This is not universally true, for there are some classes of soil in Rhodesia, such as Mopani veld, which bake and harden to such an extent that practically every form of plant life is killed in the winter and the new growth in spring is made from seeds. Even in this class of soil paspalum is reported to have survived.

The conditions regulating the growth of the paspalum may now be considered. The soil should be fairly fertile, as the plant is a perennial, and once the grass is established it is not possible to give the land further attention for many years. It does best on moist black soils rich in humus. On the red soil it does well, but dies down in winter, not completely, however. On granite soils that are stirred occasionally to keep a mulch on the surface, it keeps green almost throughout the winter and makes rapid growth as soon as the frosts cease. On very hard baked soil, such as Mopani veld, it is not killed off during the winter, but makes somewhat slow growth during the spring.

Once the frosts are over the rate at which the plant will grow depends upon the moisture in the soil. In moist situations such as are found on the sand veld or black vleis growth is rapid in early spring, providing a good bite for cattle during the trying months of September and October. In dry situations some growth is made in September, usually far more than is made by any of the native grasses. But under conditions of great dryness growth is slow. Wherever it is possible harrowing the ground will help the soil to retain moisture and enable the paspalum to make more rapid growth than otherwise.

Paspalum seed is slow to germinate, and requires a good deal of moisture to soften the outer coat surrounding the seed. Hence it should not be sown before the rainy season is well on, say from January to March. The seeds should be lightly covered, and the ground *rolled* if possible. Rolling is an operation the importance of which has not yet been sufficiently realised in Rhodesia. About five pounds of seed per acre is sufficient, although more is usually sown owing to the alleged poor germinating quality of the seeds. Root slips can be planted from December to March, two or three feet apart each way.

The plant produces seed very abundantly, and this may be gathered for further propagation. An occasional harrowing of the ground after the grass has been cut for hay, say in April, will enable the seeds which have been shed to germinate. The seeds are rarely blown long distances by the wind. Generally they are carried long distances down hill by rain water. Hence the plan is sometimes adopted of sowing them in furrows on the higher portions of the farm, and trusting to the rains to wash the seed to the lower regions. Sometimes a rudimentary root is formed on the stem, 12 inches or more above the ground. It resembles a swollen joint on the plant, and a young rootlet is frequently seen. These will grow, if planted, just like an ordinary root slip. The bigger roots may be dug up and divided into slips with impunity.

If intended solely for pasture purposes the grass should not be allowed to grow coarsely during the summer, but should be accessible to stock at all times. If a hay crop is desired it is best to cut before the seeds are ripe. It is an excellent plan to cut paspalum in March or early in April, if weather permits

of hay making, as the aftergrowth will then provide excellent grazing, which can be used for sheep as well as for bigger stock. In the green stage paspalum has a great reputation as a milk producer, being particularly valued for milch cows and brood mares. Sometimes a belt of paspalum is sown round a farm to act as a fire guard. This is quite effective for the purpose if it can be grazed down.

On account of the firm grip which paspalum roots have on the soil this grass is frequently planted out in places where dongas are beginning to form. It is also used in fortifying the slopes of river banks or dam walls.

Much has been made of the fact that animals sometimes do not take readily to paspalum at first. The following reports from farmers are the best comments on the mistaken idea that stock are not partial to this highly nutritious grass :—

Marandellas, 15/6/12.—“Sown in ridges on black granite vlei. At the end of the first season the paspalum had completely covered the ridges, each slip making a large clump. The grass seeded well. On red land the seed was sown in 1911, and last winter afforded grazing for sheep and pigs. During this last wet season it has seeded and the young plants nearly cover the ground. It does best in the rich black vleis. Frost kills the tops for a short time, but as the grass does not stop growing it is soon green again. . . . Stock always get a picking on the paspalum when all other grasses have been killed by frost or burnt off.”

Bulawayo, 11/6/12.—“Paspalum does not stand drought well, and wilts and dries up at the first sign of frost. While it is green cattle prefer it to ordinary veld.”

Melsetter, 28/5/12.—“Planted on old mealie land of a very poor sandy nature, covered with blackjacks and twitch. This was manured lightly, ploughed, and harrowed twice. The seed was sown and a thick crop of weeds appeared. The paspalum, however, gradually asserted itself, and completely crowded out the weeds. It gradually made a solid turf, and patches have appeared at a lower level 200 yards away. The lack of rain last summer did not affect it in spite of being on non-irrigated, dry, loose sandy soil. . . . If long strips of

land were ploughed on the higher slopes, I think the rains would sow the seeds on the lower parts."

Plumtree.—"In July a sharp frost burnt every blade of it down to the roots."

West Nicholson.—"My farm is all of driest land; 10 in. rainfall in 1911 and 6.6 in. in 1912. Until this year the paspalum has grown and kept green in winter, but this year it has turned brown and withered."

Eldorado, 27/6/12.—"I think it one of the most suitable grasses I have seen. Although on very dry land, and subject to severe frosts, it has remained green since time of planting up to now, a period of eighteen months. The only trouble I have is in keeping stock off it, as they eat it very readily."

Somabula, 29/6/12.—"The paspalum was sown in a naturally moist vlei, and made good progress and seeded freely in spite of the meagre summer rainfall, amounting to 10 ins. for the season. In spite of having no rain since the middle of February, the paspalum to-day has plenty of green feed on it for sheep, in great contrast to the surrounding veld grasses, which are dry and parched up on account of drought and heavy frosts. Our wet vleis this year have not a vestige of moisture in them, and are as hard and dry as a road, but the paspalum looks well, although grazed every day."

Odzi, 13/6/12.—"The paspalum has been a complete failure, and in my opinion is only useful when irrigation is possible."

Insiza, 3/6/12.—"Paspalum doing very well on a wet piece of ground. It has sown itself, and is gradually monopolising the ground; a valuable asset for stock feeding purposes. Frost had no effect upon it. It is certainly relished by all stock."

Mazoe, 31/5/12.—"Paspalum roots planted 24th February, 1911. To my surprise, on visiting it in October, 1911, it had stooled out tremendously and had all seeded. I did not expect to find it alive, as the soil had very little moisture in it."

Nyamandhlovu, 1/6/12. — "Two acres of paspalum planted December, 1910, on black vlei soil full of humus and

exceptionally fertile. The plants grew off quickly and stooled our exceptionally well. The grass remained perfectly green and succulent until the latter half of June, and a few head of imported cattle were grazed on it. Subsequently very severe frosts caused the grass to go off very much, although there always remained a certain amount of green undergrowth. Growth commenced towards the end of August, and provided a good bite for stock during the two worst months, viz., September and October. It was cut for hay last March. By this time the plants had so spread out as to almost cover the ground with a solid turf. At date of writing it is quite as fresh and green as at mid-summer."

Penhalonga, 30/5/12.—"Paspalum slips purchased two years ago. . . . I mean to put down 50 acres next summer."

Gwelo, 21/5/12.—"Paspalum seems to stand drought well, and the stock keep it fed down."

Plumtree, 23/5/12.—"In December, 1910, 400 slips were planted out three weeks from the date they left the Department of Agriculture, on a piece of wet ground. No rain fell for a month after planting. All the slips grew, none failed, and some came to seed in March. By last December each slip had grown into a root containing an average of 12 roots. . . . I don't think frost affects it if planted in a moist place, as it recovers at once. It adds enormously to the carrying capacity of a farm, and keeps cattle in condition and health when otherwise they would be suffering from starvation."

Insiza, 24/5/12.—"The paspalum slips did very well in rich black soil on the edges of a creek. It seems to stand frost well, but requires a certain amount of moisture to grow in winter."

Macheke.—"Planted on very poor ground, light sandy soil. It has kept green all the time far better than the veld, and has grown very strong."

In conclusion, we may remind farmers that slips of paspalum may be obtained from the Department of Agriculture at a cost of five shillings per thousand in bags free on rail, Salisbury. Remittances should accompany orders.

Utility Poultry Keeping for Amateurs and Beginners.

By "GALLINULE."

The erection and regulation of all incubators are sufficiently described in the handbooks provided with all machines. The directions given by the makers should, as a rule, be followed implicitly in working the machine during the first hatch, but as the worker gains in experience he will often discover that some modification of the system may give better results, and it is with such modifications that the best results are usually obtained.

The first requisite in all hatching is the maintenance of an even temperature. Now, no machine at present on the market does more than keep a good rate. Fluctuations are always occurring; though they pass unnoticed in many instances, as the greatest changes in temperature usually fall between midnight and three in the morning. It is greatly to be desired that a minimum self-registering thermometer be occasionally placed in the egg-tray before retiring at night, and examined when the eggs are turned in the morning. During the day a good clinical thermometer should be left in the drawer. In this manner fluctuations otherwise unsuspected may be noticed. If we now find that the rise above normal be usually greater than the fall, we shall do well to lower our working temperature; or, if the reverse be the case, raise it. Suppose that we discover that our afternoon temperature has a tendency to rise to 105 deg., when we are trying to work at 103 deg., and that our early morning fall does not extend below 102 deg., we should regulate to obtain a temperature of about 102.5 deg. Should we find that our chicks are out too soon, we know that our average temperature has been too high; but if, on the other hand, our eggs are not all hatched at the close of the twenty-first day, it will be clear that our average has been too low. It may be

taken as a general rule that high temperatures are not as harmful to a hatch as low ones. Temperatures of even 109 deg. will not necessarily spoil a hatch, unless of long continuance and frequency recurrence. In fact, if high temperatures are noticed in time, and the eggs are immediately turned and cooled thoroughly, while due precautions against chill are taken, the hatch need not suffer in any marked degree. Seeing that an even temperature is the first requirement in order to succeed, we should aid our machine by placing it where the heat of the outside air varies as little as possible. In even the best constructed dwelling-houses, day and night temperatures vary as much as 15 deg., while in less well constructed buildings a variation of 25 deg. to 30 deg. is no unusual thing. Under circumstances such as these it is useless to expect our incubators to do more than keep a fair average. A room with a southern aspect is usually the most suitable situation, but nothing can compare with a well ventilated cellar. If we are provided, or can provide ourselves, with an underground chamber, the floor of which is 15 feet at least below ground level, and either covered by a dwelling above or roofed with a sufficient thickness of earth, we may reckon upon good hatches with confidence.

Next in importance to an even temperature in the egg drawer, may be placed the even supply of moisture. All water-tank machines are provided with a water tray, and in some hot-air hatchers also moisture is provided. Unfortunately it is the fashion for most makers to assure their customers that their water appliances are automatic. Such is never the case. The lower the outside temperature, the greater must be the heat in the tank of a Hearson style machine, and the more rapid is the draught. In such a case the eggs dry out more quickly than when there is less draught. When the outside air is but little cooler than that in the drawer, drying does not proceed rapidly enough, and in extreme cases the eggs may actually be observed to absorb moisture. It, therefore, follows that the supply of moisture must be regulated in accordance with the drying out of the egg. The learner who really wishes to master the art of incubation should set a good hen on the same day as that on which he starts his machine. From day to day by means of an egg-testing lamp he should watch the **increase of size** in the air cell, and endeavour, by supplying or withdrawing moisture.

from the incubator water tray, to regulate the drying down of the eggs in the incubator. For those who are unable or unwilling to take this trouble, it may suffice to say that in working machines of the Hearson type in Rhodesia during the winter, water must be supplied daily in sufficient quantity to keep the canvas in the tray thoroughly damp, but no more moisture should, as a rule, be given than the canvas can absorb. Daily addition of water gives much better results than larger supplies at less frequent intervals. In a hot, dry December water should not be placed in the tray during the first week, but thereafter should be added and supplied until the end of the hatch. Better still is a practice observed by a few of working with wet and dry canvas on alternate days up to the sixteenth day, after which time the canvas is kept continually moist. During hot, steamy weather the canvas should be dry until the end of the hatch.

The Cyphers incubator works fairly well without moisture, but much better results are obtained by those who supply a little moisture during dry weather. This is done by placing a shallow tray containing damp sand beneath the egg tray, which precaution should never be omitted on the last days of the hatch.

Less important than even temperature and moisture, but still demanding our careful attention, is the selection of eggs. They must be fresh, not older than a week, laid by mature active hens in good health and condition. The shells, when viewed through a testing lamp, should shew no large semi-transparent lines nor large spots, but should be of as even a texture as possible. Pullets' eggs should be avoided, as there is no more frequent cause of degeneration than hatching from immature birds. The early eggs of a two-year-old hen mated to a vigorous ten-month cockerel can hardly be surpassed for setting. Eggs from a hen which has just started laying are better than those of one which has already laid a large batch.

In winter eggs should not be turned before nine o'clock in the morning, for if this is done too early it takes some considerable time before a proper temperature can be reached. The morning is usually the best time for cooling, but hatchers must consult their own convenience and the indications of the thermometer. If there has been an early morning fall, it will be

better to put off cooling until the afternoon. During hot summer weather I find four o'clock in the afternoon an ideal time, and usually leave the eggs out for a full hour or more. If one cools in the afternoon one should not turn until late in the evening, and then the turning should be performed quickly. Three minutes may be required by a beginner to turn 120 eggs, but a practised hand can perform the operation in less than half that time. To facilitate turning one should have a good light, and take care to mark the eggs in such a way that the difference in form between the under and upper mark is visible at a glance. One mark should be a cross or Roman initial to indicate the hen or the seller of the eggs; and the other had best consist of a date, either that on which the egg was laid or the date of setting. The turning is facilitated by wetting the index finger.

When we remember that the object of turning is to prevent the germ drying fast to the shell, we shall see that turning and cooling are essential whenever the eggs become overheated.

Every hatcher should provide himself with the most powerful testing lamp he can obtain. Hearson's large candle lamp is one of the best.

Fertile, unfertile and addled eggs are easily differentiated after the fourth day, and all makers' handbooks give sufficient information to students to enable them to distinguish between them. Fertile eggs on the fifth day shew a black spot, from which red lines radiate; addled eggs shew a greyish cloudiness, and unfertile eggs are clear. The examination of a hatch under a hen from day to day will teach the learner more than reams of print, and the very beautiful illustrations on the back of Messrs. Hearson's pamphlet, "The Problem Solved," are the next best thing to first-hand observation.

The importance of the tesing lamp cannot be exaggerated, for thereby the supply of moisture may be controlled to perfection and the harm frequently caused by eggs rotting in the drawer avoided.

Notes on Bee-Keeping.

By FREDERICK SWORDER.

SUBDUING AND HANDLING BEES.

In providing two useful commodities, viz., wax and honey, it cannot be denied that bees were created for the use and comfort of mankind, and while bee-keeping is acknowledged to be one of our oldest industries, yet it is chiefly owing to the fact that these insects possess a weapon of defence which prevents so many people from devoting to them that attention which they certainly deserve. Under the present system of management, viz., with frame hives, we can by adopting precautions take all reasonable liberties with them without exciting their anger.

Strangers to the craft are filled with astonishment when beholding an apiarist, with the aid of only a few puffs of smoke, opening hive after hive, removing frames of comb with the adhering bees, shaking them off if need be in front of their home, pointing out the difference between the Queen, workers and drones, possibly pushing away with his finger these subdued insects in order to shew the novice their respective cells still containing another generation in being, and perhaps placing the whole community into another hive. To the timid novice this all seems astonishing, for he is well aware that each member of this living mass, numbering from 5,000 to over 50,000, possesses a weapon of defence capable of inflicting much pain. Yet the few puffs of smoke previously blown into the entrance of the hive have been the means of frightening its inmates, causing them at once to run to their storehouse and fill themselves with honey. While in this condition they are in a contented frame of mind and do not resent man's interference.

Previous to opening a hive for examination, by adopting these simple measures, coupled with slow movements and gentle handling of the frames, we are able to deal with bees as we would with harmless flies. It is a fact worth remembering that when a bee is full of honey, unless accidentally injured, it will seldom sting. Many of the uninitiated are under the impression that most bee-keepers are blessed with a certain charm by which they are enabled to deal successfully with bees, but such is not the case, for with care almost anyone can handle them. The main reason why experienced bee-keepers can in most instances accomplish what they undertake is, that they have carefully studied these interesting insects and thoroughly understand their ways. False ideas and prejudices of long standing which die hard are in a large measure responsible, besides being a great obstacle to the introduction of the frame hive.

Every bee which goes to make up a swarm, just previous to its departure gorges itself with honey: the bee-keeper, knowing this fact, works on this principle, he realising at once that the whole multitude which have left the hive are under his control, and so soon as they have settled on a convenient branch of a tree or elsewhere, he can fearlessly secure them in any clean box or other receptacle without the aid of veil, gloves or smoke. Many bee-keepers are under the impression that this feast of sweets is not the only reason why the bee is then so quiet, for it is seen that when the stomach is empty she can the more easily curve her body to drive the sting perpendicularly into our flesh, whereas when her honey sac is full the segments of her abdomen are distended, therefore she finds more difficulty in taking the desired position for stinging.

Anyone who contemplates keeping bees must own a good bee-smoker and a black net veil. The early morning in the summer months is a very suitable time to examine hives, suspending operations when the sun gets warm. When about to examine a hive get the smoker well alight and make sure that it will not go out in the middle of your manipulation.

Dry, coarse brown paper loosely rolled up and placed in the smoker with the lighted end downwards will burn until it is consumed: this is, provided the smoker is placed in an

upright position. If you wish your smoker to go out, lay it down. Learn to look upon the smoker as your life-preserver, for such, in fact, it is.

In spite of the precautionary measures already explained for subduing bees, there are times when we are quite unable to keep them quiet; in such cases it is far better to at once cover the hive down and walk away as quietly as possible to the lee side of their home, retreating to a dark room or building for a few minutes. When bees are in this persistent frame of mind, perseverance on our part is then of little avail, for most probably something unknown to us has occurred to disturb their peaceful calm. The next day will in all probability find them quite submissive to our will.

Should a bee inquisitively fly around the face do not strike at it with the hand, as this action greatly tends to render them unmanageable for a long period, and possibly for the remainder of the season.

When hiving a swarm, and more particularly when examining frames of comb to which bees are clinging, never breathe on them, for scarcely anything annoys them more.

It must be understood that our hives in Rhodesia will stand in the shade with the entrance facing the early morning sun, that is, east or north-east, which is the correct position, and, bearing in mind that our prevailing winds blow from that direction, it follows that in manipulating the hive the operator is on the lee side or at the back. This position is advantageous, for then he does not obstruct the flight of the bees; also his breath is blown away from the hive.

At times during a long or thorough examination of the hive interior, it may be necessary as a relief to our feelings to heave a deep sigh; don't breathe on the bees, but turn your head in another direction.

Worsted gloves worn as a protection to the hands or coarse woollen garments are very distasteful to bees. If at first it becomes necessary to wear gloves they should be of leather or rubber, but so soon as confidence is gained these may be cast aside, for all manipulations are executed far better with bare hands.

In handling bees in this warm climate I always take off my coat and recommend its universal adoption, as this gives greater freedom for work; it also reduces perspiration, for which bees have no liking. It is also extremely dangerous to manipulate bees anywhere when live stock are in close proximity, for then anxiety and trouble on our part and possibly death to the animals will be avoided.

When stung, it is always best to get rid of the poison-pumping weapon as quickly as possible; do not pinch it out with the thumb and finger, but simply scratch it out with the finger-nail at once, for it must be remembered that although the sting has left its owner the muscles are still working.

Having done this, with your smoker blow a puff of smoke on to the wound: this will have the effect of counteracting the strong smell of the poison which is already pervading the air, and work can again proceed until the operation is completed.

Cold water is a good remedy for a bee sting.

Bees have a great aversion to the smell of carrot-tops, therefore this class of vegetable should not be grown in close proximity to the hives.

It is wise when the early morning sun gains power to stand in such a position so as to shade the opened hive, and do not then expose any more frames than are absolutely necessary, but keep them covered with the quilts.

All these hints which are helpful in a large measure tend to keep the bees quiet, while with each succeeding manipulation the novice realises with satisfaction that he is improving in his methods.

Occasionally a vicious lot of bees will be met with; these rascals can usually be subdued by moderately beating on the back or side of the brood chamber with the palm of the hand, after having smoked them at the entrance.

Remember to always use smoke first, followed with the beating by continuous and regular strokes for about half a minute and sufficiently hard to jar the combs. This proceeding will cause the inmates to still further gorge themselves.

In several obstinate cases I have been compelled to use the carbolic cloth, and it has proved quite effective. This indispensable adjunct to any apiary will be explained and its use set forth in a future article.

In comparison with our native Rhodesians I find both the Italian and the Transvaal bees more easily subdued, for when these latter races shew the slightest inclination to anger after the hive has been opened, a few gentle puffs of smoke occasionally given on the tops of the frames are sufficient to keep them quiet. An angry bee can be detected by the high-pitched note while on the wing.

Some bee-keepers are brave enough to open their hives and handle their own bees without using any smoke, but I would certainly not recommend anyone taking this risk, for we must assure ourselves that they have been previously gorged.

As far as possible think ahead : have everything ready to hand, use care, exercise patience and perseverance, cultivate firmness, always endeavouring with each succeeding manipulation to correct previous mistakes, and it will be found that by adopting these principles a great step in advance has been made towards gaining that confidence which is so essential to success.

(To be continued.)

How to make use of the Fencing Ordinance, 1904.

By N. H. CHATAWAY.

The procedure necessary to obtain the enactment of the Fencing Ordinance of 1904 briefly stated is as follows. The owners of landed property in any district desirous of having the Ordinance brought into operation should first frame a petition in the form set forth below.

PETITION IN TERMS OF SECTION 4 OF THE FENCING ORDINANCE, 1904.

District.....

Date.....

To the Director of Agriculture, Salisbury.

Sir,—We, the undersigned, being residents of Southern Rhodesia and the owners of the landed property situated in the District of as described below, do hereby request that His Honour the Administrator may be pleased, in terms of Section 4 of the Fencing Ordinance of 1904, to put into force and apply the provisions of Part I. of the said Ordinance to the undermentioned area.

Description of area :—

That District, or that portion of the District of (as the case may be) within the following boundaries. From the.....beacon of

.....farm along the..... andboundaries
of this farm, thence along the.....boundaries
of.....farms, etc., etc., etc.

Signature	Residence	Name or Description of Landed Property owned

This petition must be signed by at least two-thirds of the owners of land within the area resident in Southern Rhodesia (not necessarily resident on the land they own).

It should be noted that each owner has only one vote, irrespective of the number or size of properties within the area that he owns.

An "owner" is described in the Ordinance as—

- (a) Any person, company, co-partnership, or public body in actual occupation of or entitled as owner to occupy any land alienated from the British South Africa Company, or entitled by virtue of any certificate or document conferring a right to claim any land from the British South Africa Company.
- (b) The Council or other governing body of any Municipality or Corporate Town, in respect of all lands to which or to the use of which the inhabitants of such Municipality or Corporate Town have acquired or may hereafter acquire a common right.

It follows from this that lessees of farms, in which must be included holders of land under "permit of occupation," have no vote.

A notification is to be issued in the *Government Gazette*, and one or more newspapers (if any) published and circulating within the District at least once a week for three consecutive weeks. If there is no newspaper published in the District the Notice should also appear in the paper published in the nearest District.

The following is a suitable form :—

NOTICE.

FENCING ORDINANCE, 1904.

Notice is hereby given that it is the intention of owners of landed property situated in the District of..... as described below, to petition His Honour the Administrator to bring into force and apply the provisions of Part I. of the Fencing Ordinance of 1904 to the undermentioned area :—

Description of Area :—

That District, or that portion of the District of (as the case may be).....within the following boundaries : From the.....beacon of the farm..... along the.....boundaries of this farm, thence along the boundaries of the farms..... etc., etc., etc.

Dated at, Signed this.....day of.....191 , for self and Co-petitioners.

As soon as these formalities have been complied with, the petition, accompanied by a copy of the notice and a sketch map of the district or area referred to, should be forwarded under a covering letter to the Director of Agriculture, Salisbury, requesting him to submit to and recommend the same for the consideration of His Honour the Administrator.

The covering letter should state the dates of *Gazette* and newspapers in which the notice appeared, and it should be signed by an owner or agent representing the petitioners to whom all subsequent correspondence on the subject will be addressed by the Director of Agriculture.

When the proposal has received the sanction of His Honour the Administrator, it then becomes competent for any landowner within the area to require his neighbours to join in or contribute to the construction of fences on mutual boun-

daries, in such proportion as may be agreed upon between them. To this end he should serve a notice in writing on the person he desires to contribute, specifying the boundary to be fenced, the kind of fences and mode of erection proposed. (*See specimen letter A.*)

If within three months no agreement is arrived at in respect of any of the above points the matter is to be settled by arbitration. (*See specimen letter B.*)

If either of the parties fails to carry out any of the work of construction that he has agreed to do, or has been allotted by an Arbitrator, the other party may carry it out and recover the share of the cost that the first party should have contributed, in any Court of competent jurisdiction.

The person called upon to contribute to the construction of a dividing fence may, by giving notice within one month of the amount being fixed for which he is liable, pay such amount by equal annual instalments with interest at 6 per cent. per annum added. (*See specimen letter C2.*) If the capital amount does not exceed £100 the payments may be extended over five years, and if the amount exceeds £100 the payment may be extended over ten years. In a schedule to the Ordinance there is given a table for calculating the amounts payable every year for five or ten year periods.

Owners of land adjoining an area on which the Fencing Ordinance is duly proclaimed must contribute towards the cost of fences on that boundary.

When an owner is absent, or cannot be found, or any land is unoccupied, the owner of any adjoining land who wishes him to contribute to the cost of a fence must advertise at least once a month for three months in the *Gazette* and a paper circulating in the district, requiring him to contribute. (*See specimen notice D.*) He may then obtain an order from the Magistrate authorising him to proceed with the construction. If thereafter any person goes into occupation of the adjoining land he may serve him with a notice within one month (*see specimen letter E*), and recover half the then value of such fence.

Tenants, excepting those whose unexpired term of lease does not exceed one year, are liable to pay interest at the rate

of 6 per cent. per annum on half the cost of construction; and tenants who have the right of purchase are liable to have any sum paid by the owner for construction of fence added to the purchase price.

Owners of land on either side of dividing fences are liable for the cost of repairs in equal proportion. An owner can serve on his neighbour a notice requiring him to assist in repairing such fence (*see specimen letter F*), and if the second owner refuses or neglects to do so, after one week the first owner can make the repairs and recover his share from the second. Fences destroyed by accident may be repaired without notice. If the fence is damaged through the neglect of either of the parties he only is liable for the whole cost of repairs.

The Ordinance does not affect any substantial fence already erected at the time of the coming into operation of the Ordinance.

Part II. of the Fencing Ordinance applies to the whole of Southern Rhodesia, whether Part I. is in force or not, and contains the following provisions :—

If the owner of any land erects a fence on the boundary of his land, and any other person shall adopt any means by which such fence shall be rendered of beneficial use to himself, he shall be liable to pay the owner of the fence interest at 6 per cent. per annum on half the then value of so much of the fence as he makes use of, and shall also be liable for half the cost of repairs.

Any person erecting a fence on land covered with bush is entitled to clear the bush for a width not exceeding six feet on either side of such fence, and to remove any tree standing in the direct line of such fence. The cost of clearing may be added to the cost of the fence in cases where any part of the cost of the fence is to be recovered from another party.

Where a river forms the boundary of contiguous lands but is not capable of resisting the trespass of animals liable to be impounded, it shall be competent for the owners to agree upon such a line of fence on either side of the river as shall secure such fence from the action of floods; and in the event of their not agreeing upon such a line of fence, and whether any

or what compensation in the shape of an annual payment shall be paid to either party for loss of occupation of land, the question shall be settled by arbitration.

If the owner of any land shall clear the same of inflammable materials for the space of fifteen feet from any boundary fence and the owner of the contiguous land shall neglect so to clear his land, such owner shall be liable for any damage done to the fence by fire due to such neglect and is required to make good the damage within one month, failing which the neighbouring owner may make good the damage at the expense of the owner in default.

Every person engaged in constructing or repairing a fence under this Ordinance may enter upon the contiguous lands, if necessary, at any reasonable times and do any reasonable acts thereupon that may be required for the construction or repair of the fence, but he may not enter upon any cultivated ground, garden, plantation, or pleasure ground or cut down or lop any fruit or ornamental trees or shrub without the consent of the owner.

Any owner to whom any amount may be due by any person by way of contribution towards the construction of a dividing fence, may call upon such person to pass a mortgage bond upon his land. (*See specimen letter G.*) If the said person shall refuse or fail to pass such mortgage bond the owner may notify to the Registrar of Deeds the fact that the amount is owing and no mortgage has been passed. (*See specimen letter H.*) The Registrar of Deeds shall then notify the person named, the fact and particulars of the notification received from the first party, and if no objection is lodged within three weeks the amount of the debt is registered in the Deeds Office and no transfer or mortgage on the property can be passed until the bond above referred to has been duly passed. Should any objection be raised no entry shall be made in the Deeds Office registers except with the consent of the said person or upon the order of a competent Court.

Copies of the Fencing Ordinance No. 18 of 1904 may be obtained from the Controller of Printing and Stationery, Salisbury.

SPECIMEN LETTERS.

A.—Letter calling upon a neighbour to join in the cost of a fence.

Dear Sir,—

I beg to inform you that I propose to erect a dividing fence on the border of this farm and that of..... and call upon you in terms of section 6 of the Fencing Ordinance, 1904, to contribute towards the cost thereof. The line concerned runs from.....to.....

I propose the erection of.....(*here state kind of fence to be erected, material, cost, etc.*) and that.....(*here state proposals for erection, by what means, cost, etc.*)

Yours faithfully,

B.—Letter calling upon a neighbour to go to arbitration.

Dear Sir,—

With reference to my letter of.....(*see A*) in view of our failure to arrive at an agreement with regard to.....(*here state points on which no agreement arrived at*) I now propose that the matter should be settled by arbitration in terms of Clause 7 of the Fencing Ordinance, 1904, and have nominated Mr.....to act as arbitrator on my behalf. Will you, please, nominate an arbitrator to act for you?

Yours faithfully,

C1.—Letter acknowledging A. and agreeing to share expenses.

Dear Sir,—

I have your letter of.....regarding the erection of a joint fence, and in reply beg to state that I am prepared to agree to the terms suggested and to pay half cost of all expenses (*or any other proposals as the case may require*).

Yours faithfully,

C2.—Letter acknowledging A. and requesting to pay by instalments.

Dear Sir,—

I have your letter of.....regarding the erection of a joint fence, and in reply beg to state that I am prepared to agree to the fence suggested, but wish to avail myself of the provisions of Section 9 of the Fencing Ordinance, 1904, and to pay the amount of my share of the cost by instalments with interest at the rate of 6 per cent. per annum. extending over a period of.....years.

Yours faithfully,

(See in reply specimen G.)

D.—Notice in Gazette and Newspaper calling on owner whose address is unknown to contribute.

To A.B., owner of farm.....situated in the District of.....

Take notice that I intend to fence my farm..... and in terms of Sections 5 and 11 of the Fencing Ordinance, 1904, I hereby call upon you to contribute towards the cost of construction of the fencing of our common boundaries from.....to.....

(Sgd.) C. D.

E.—Letter to person occupying hitherto vacant land which has been fenced.

Dear Sir,—

I beg to enclose herewith copy of a Magistrate's Order dated.....authorising me to construct a dividing fence between farm.....now occupied by you and farm.....of which I am the owner, and in terms of Section 11 of the Fencing Ordinance, 1904, have to call upon you for payment of half the present value of the said fence, which I estimate at £.....

Yours faithfully,

F.—Letter calling on neighbour to assist in repairing a boundary fence.

Dear Sir,—

I beg to inform you that the boundary fence dividing our farms.....and.....is out of repair (*here state nature and extent of damage*). I therefore beg to call upon you to assist in repairing the same in terms of Section 15 of the Fencing Ordinance, 1904.

Yours faithfully,

G.—Letter calling upon neighbour to pass Mortgage Bond.

Dear Sir,—

I beg to acknowledge your letter of.....(see specimen C.) and note that you wish to pay your share of the cost of our joint fence by instalments. I am agreeable to this, provided you pass a mortgage bond over your farm in terms of Section 29 of the Fencing Ordinance, 1904 (*or other security can be arranged by mutual agreement*).

Yours faithfully,

H.—Letter to Registrar of Deeds notifying debt owing by neighbour for fencing.

Sir,—

In terms of Section 30 of the Fencing Ordinance, 1904, I have the honour to notify you of the undermentioned debt incurred in connection with a joint boundary fence between the farms.....and....., and to request you to register the same in the Register of Deeds.

Name of farm.....

Amount owing

Situation and name of property in respect of which Bond has been demanded.....

Date of the grant or transfer of the said property to the said person.....

The above amount has been agreed upon, or ascertained according to law, and the person above named has been duly called upon to pass a mortgage bond and has failed to do so.

I am,

Your obedient servant,

Bulletin of the Imperial Institute.

This Bulletin, first published in 1903, now appears in a new guise. It is devoted to furnishing information on colonial products, and contains the results of investigations conducted in the Scientific and Technical Department of the Imperial Institute; articles and notes dealing with mineral and vegetable economic products; and a quarterly summary of information on recent progress in agriculture and the development of natural resources, particularly in British Possessions.

Until this year the Bulletin has been published by the Imperial Institute, but owing to the increased demand for it, its publication has now been undertaken by Mr. John Murray, 50a, Albemarle Street, London, W., and the first number of the new series has appeared.

As shewing the varied interests served, we may mention some of the principal contents of this first number, as follows :

Rubber resources of Uganda; Some cotton soils of the Nyasaland and Uganda Protectorates; Aromatic grass oils, Part III.; Hibiscus fibres from the Northern Territories, Gold Coast; Timbers from Uganda; Sumach from Cyprus; Economic products from Mauritius; The cocoanut and its commercial uses, Part I.; Cultivation, preparation and utilisation of hemp and hemp seed (*Cannabis sativa*); Cultivation and preparation of ginger; Sisal hemp in Quilimane; New Zealand hemp; Iron ore from Trinidad; Copper-mercury ore from Queensland; Native labour regulations in Mozambique.

The second number, now in the press, will have the following principal contents :—

Tobacco industry of Ceylon; *Ficus elastica* rubber from Southern Nigeria; "Balata" rubber (*Ficus Vogelii*) from Southern Nigeria; The rubber of *Cryptostegia grandiflora*;

Silk from India; Cotton and Sisal hemp from Papua (British New Guinea); Fibres from India; Utilisation of *Caesalpinia digyna*; Oil-seeds of *Telfairia pedata*; *Lophira* oil-seeds from West Africa; Oils and oil-seeds from Hong Kong; West African cocoa; The cultivation of cigar tobacco, with special reference to Java; The cocoanut and its commercial uses, Part II.; Rubber-tapping experiments in Southern Nigeria; Economic developments in the Belgian Congo; Citronella grass; *Mesembrianthemum Mahoni* roots from the Transvaal; Cultivation of fibres in Java; "Root-cotton."

The annual subscription to the Bulletin is 11/- post free; single numbers may be purchased at 2/9 post free.

Correspondence.

To the Editor,

Agricultural Journal,

Salisbury.

Sir,—

To settle a little dispute, could you or any of your readers please state, through the medium of the Journal, how many bulls would it be possible for one man to castrate and brand in one day with native assistance?

328 bull calves varying from nine to fifteen months were castrated and branded by myself and 14 native assistants in seven hours, which is an average of over 46 per hour, and which is considered a record.

None of the animals died from effects.

I am, etc.,

W. VAN HENSSEN.

Central Estates, P.O., Umvuma.

REPLY.

The above enquiry was referred to Mr. R. C. Simmons, Chief of the Animals Industries Branch, who comments as follows :—

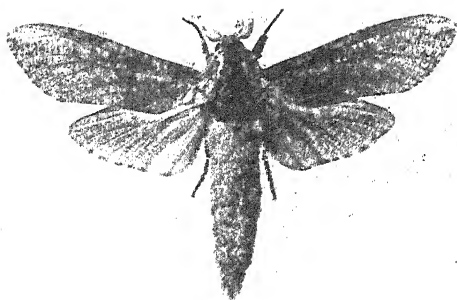
The number stated to have been castrated and branded per hour certainly seems incredible. I conclude the Boer method of castration, namely, with a pocket knife and a little salt, was adopted, which is of course expeditious if not too satisfactory. It is not stated how much of the work was done by the natives, but I am of opinion that if only one man is operating, and that the calves, brands, etc., are held in readiness for him to work without interruption, by the Boer method he may castrate and brand about 30 properly, and by the more modern method of searing, about 20 or 25 per hour. I should be interested to see the appearance of the brands on the 328 calves mentioned.

Notes from the Agricultural Laboratories.

ENTOMOLOGICAL.

MOTH BORER IN CASTOR OIL.—Experimental plantings of Castor Oil in the Transvaal and Rhodesia have indicated that whatever may be the prospects of establishing the industry in South Africa, the insect factor is one of the more serious handicaps to success. This view has been amply supported by the result of a small planting made in the spring of 1909 at the Experimental Station, Salisbury. By the 1911-12 season practically every plant of the original planting was infested and either severely injured or killed by the insect shewn in the accompanying plate. The volunteer plants that had come up from dropped seeds germinating in the spring of 1910, however, had not yet been attacked. As a result the plants have been rooted up and the experiment marked on the list of failures.

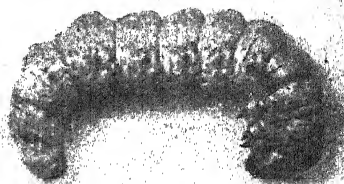
Several species of insects have been observed to damage the Castor Oil in this Territory, but by far the most serious is the moth larva that bores the stems and branches. This insect was figured in the *Transvaal Agricultural Journal* for January, 1910, under the name of *Duomites capensis*, and notes of its attacks on the Castor Oil were furnished by Mr. F. Thomsen, of the Division of Entomology at Pretoria. According to Mr. Thomsen, the eggs are laid on the stem of the plant near the ground level. We have not yet seen the eggs in nature, but a specimen of the moth in a cage laid a large clump of eggs inside an old tunnel of the larva in a Castor Oil stem. The eggs are yellowish in colour, smooth-surfaced and shiny. The method by which the young larva obtains entrance to the stem has not been observed in this Territory, but what appears



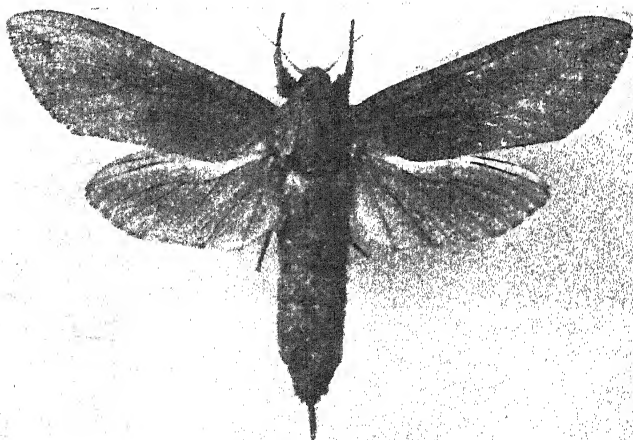
Male Moth.



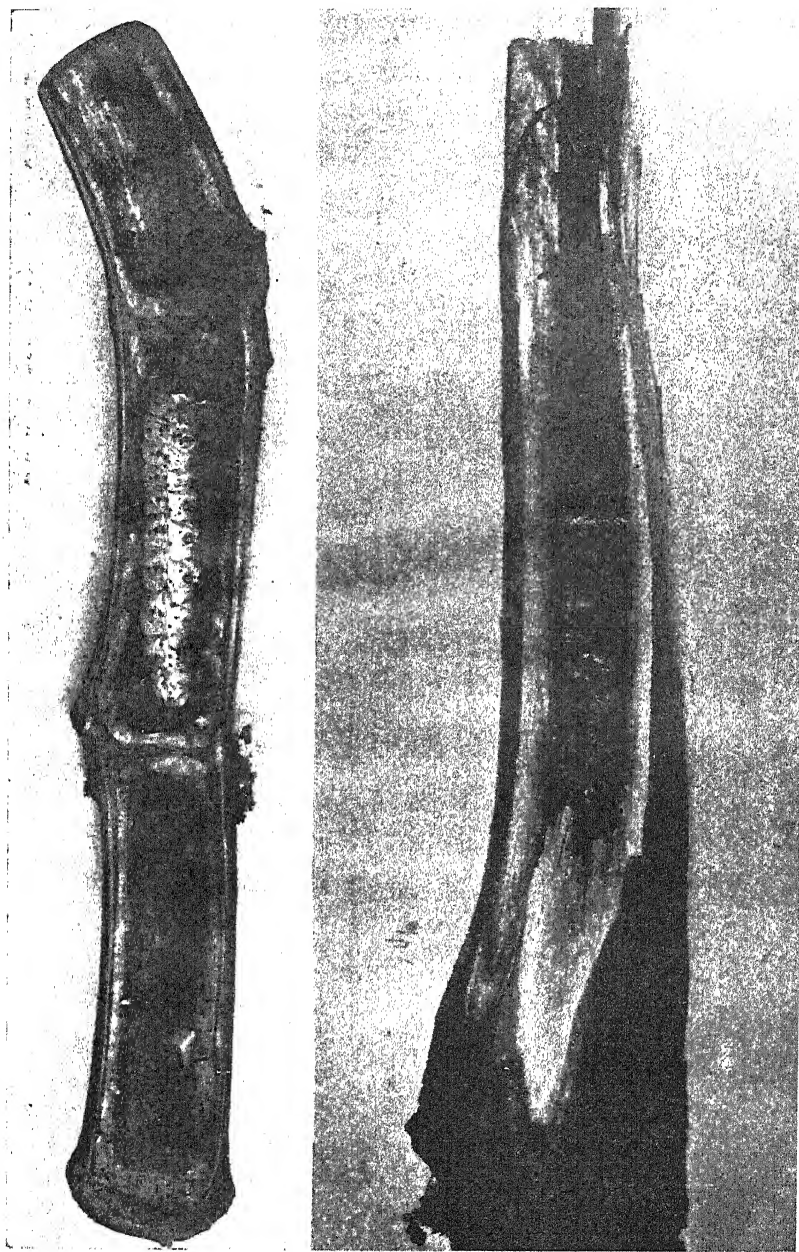
Chrysalis.



Caterpillar.



Female Moth.



Chrysalis and Caterpillar in stem of Castor Oil.

to be the young of this species have been found very commonly in the leaf buds on the stems of the plants, and in a few instances holes have been traced from these buds into the tissues of the stem beneath. It is possible, therefore, that the young borers disperse after hatching from the egg clump and make their first few meals inside the leaf buds, penetrating thence into the stems. The exit holes of the moth are usually in the lower part of the stem or branches, and the first damage is nearly always on the lower part of the stem, though any of the older wood may be attacked.

The full-grown larva measures rather over $2\frac{1}{2}$ inches in length. It is thick and fleshy with prominent segments, as may be seen by reference to the plate. The anterior end behind the head is provided with a horny shield, which possibly serves to keep ants and other insects at bay. The period of the larval stage has not been accurately determined. The larval stages of this family (*Zeuzeridæ*) are sometimes prolonged over more than one year. This species does certainly not produce only one well-defined brood in the year, as half-grown larvæ and full-fed larvæ and pupæ have been found in the same plant at the same time, and some adult moths have been bred out in May and others in August, whilst the moths in the Transvaal have been recorded by Thomsen to have emerged in September and October.

When the larva is full grown it makes preparations to pupate head downwards in its burrow. It plugs up the burrow above it with a hard plug composed of chewed wood and gum, then turning head downwards it stops the burrow with a thick wad of silk, and changes to a pupa. Pupation takes place just above a prepared exit hole for the moth. In one instance a pupa was found head upwards in a stem, but this seems a rare occurrence. The female pupa is nearly $1\frac{3}{4}$ inches in length, and is larger than that of the male, which sometimes measures as little as $1\frac{1}{4}$ inches. When the moth emerges it leaves the pupa case projecting from the hole. The pupa is provided with certain spines and excrescences, which probably enable it to wriggle its way half out of the burrow to enable the moth to emerge.

As may be seen from the plate, the female moth is considerably larger than the male, and is provided with a promi-

ment ovipositor with which to insert her eggs into crevices in the plant.

Not only do many plants die or get blown over owing to the weakening of the stem by the burrows of this moth, but their attack is frequently followed by that of "white ants," which complete the work of destruction very thoroughly.

Borers are amongst the most difficult of insects to attack. Thomsen recommends tying bands of tarred cloth round the bases of the plants to prevent egg deposition. The habit of growth of the plant frequently militates against the use of this method, even were it otherwise effective. Probably the method used in England against the Goat Moth, a near relation of the species under discussion, would be effective in this country. A thick paste made of clay, lime and soft soap is smeared over the stems and branches to prevent egg deposition. To destroy the borer in the stems, a small piece of cyanide is inserted into the hole from which the wood chips can be seen emerging, and the hole stopped up with clay. This remedy is recommended in England. A few cubic centimetres of carbon di-sulphide injected into the burrow and the hole plugged is a method also likely to be very effective. By whatever means the borers are finally killed, the holes should always be finally stopped up with grafting-wax or some other substance, to prevent the ingress of other insect enemies and injurious fungi.

Veterinary Report.

July, 1912.

SALISBURY.

AFRICAN COAST FEVER.—No fresh outbreaks and no further cases of sickness on the infected section of the Commonage.

Owing to the shortage of grass and water on the Commonage, cattle-owners were advised that they would be allowed to move some of their stock to the Makabusi Outspan. Several availed themselves of the offer, and 302 head were moved out and kept under observation for three weeks. A few deaths occurred from poverty.

ANTHRAX.—Seven pigs and one donkey died during the month : there were no appearances of anthrax in any of these.

Arrangements have been made for the removal of the pigs from the infected plots at Ardbennie.

IMPORTATIONS.—One bull imported from Kimberley was found to have more than two broad teeth, and was destroyed.

INOCULATION OF IMPORTED CATTLE.—Six Sussex bulls imported by the De Beers Company were tested with tuberculin ; no reactions.

BULAWAYO.

AFRICAN COAST FEVER.—No fresh outbreaks and nothing to report from any of the infected centres except *Collaton and Irene*. At this centre a marked falling-off in the mortality has

occurred since the institution of three-day dipping on 28th June. During the month only 19 head were destroyed as affected with Coast Fever, against 167 head the previous month.

From other causes 16 deaths occurred, mostly motherless calves.

Total number of deaths to date from African Coast Fever, 371 head.

ANTHRAX.—No further cases at Umganin.

MALLEIN TEST.—The following animals were tested on entry and found free from glanders (including Gwanda):—

Horses...	97
Mules	118
Donkeys	353

IMPORTATIONS (includes all stock imported into the Territory from the South and overseas):—

Bulls	76
Heifers	412
Sheep and Goats	5690
Pigs	25
Ostriches	24

HORSE SICKNESS INOCULATION.—17 Mules inoculated. No deaths.

UMTALI.

AFRICAN COAST FEVER.—No fresh outbreaks and no further cases of disease on the infected section of the Commonage.

IMPORTATIONS.—Eighteen head of slaughter cattle from Macequece.

INYANGA AND MAKONI.

One outbreak of scab in a native flock.

MELSETTER.

Five donkeys imported from the Transvaal were tested with Mallein at Chipinga and found free from glanders.

GWELO.

RABIES.—Several suspected outbreaks occurred, and in two cases, viz., a donkey which had bitten the District Veterinary Surgeon, and a Kaffir dog, laboratory tests shewed that both animals were affected with rabies.

The Magisterial district of Gwelo was placed under the operation of the rabies regulations for a period of three months from 25th July.

VICTORIA.

RABIES.—Several suspected outbreaks reported. Three dogs were destroyed, in one of which rabies was confirmed by laboratory tests.

The native districts of Victoria, Ndanga, Chibi, Gutu and Chilimanzi were placed under the rabies regulations for a period of three months.

No infective disease reported from any of the other districts.

J. M. SINCLAIR,

Chief Veterinary Surgeon.

Veterinary Report.

August, 1912.

SALISBURY.

AFRICAN COAST FEVER.—No fresh outbreaks and no further cases on the infected section of the Commonage.

ANTHRAX.—No fresh cases on the quarantined area at Ardbennie.

TUBERCULIN TEST.—Seven bulls imported from England by Mr. W. H. Williamson were tested and found free from tuberculosis.

HORSE-SICKNESS INOCULATION.—Six mules treated without fatality.

HORSE-SICKNESS INVESTIGATION.—Five horses immunised by the Government Veterinary Bacteriologist and one control animal were inoculated with virulent horse-sickness blood. The former were unaffected, and the latter died on the tenth day from typical horse-sickness.

MALLEIN TEST.—Five horses were tested on importation and found free from glanders.

BULAWAYO.

AFRICAN COAST FEVER.—No fresh outbreaks and nothing to report from any of the infected centres except Collaton-Irene. The number of deaths at this centre from Coast Fever was 20, bringing the total to date to 391. From other causes, chiefly poverty, seven animals succumbed.

In the extension area around the infected centres in which it was decided some months ago to enforce the regular dipping of cattle most of the tanks have been erected and weekly dipping is now being carried out.

ANTHRAX.—No fresh cases at the infected centre on Umganin farm.

HORSE-SICKNESS INOCULATION.—Fifteen mules treated without fatality.

MALLEIN TEST (including Plumtree and Gwanda).—The following animals were tested on importation and found free from glanders :—Horses, 85; mules, 54; donkeys, 442.

IMPORTATIONS.—

Bulls...	12
Heifers ...	204
Sheep and Goats ...	5241
Pigs ...	49

MELSETTER.

One horse, three mules and two donkeys were tested with mallein on importation and found free from glanders.

UMTALI.

AFRICAN COAST FEVER.—No fresh outbreaks and no further cases on the infected section of the Commonage.

MALLEIN TEST.—One horse tested on importation and found free from glanders.

INYANGA AND MAKONI.

Twenty-eight head of cattle illicitly imported from Portuguese territory by a native were destroyed.

One outbreak of scab at Inyanga.

VICTORIA.

One horse and one mule were tested with mallein on importation and found free from glanders.

HARTLEY.

One outbreak of scab.

PLUMTREE.

Thirty-four head of cattle illicitly introduced from the Protectorate were destroyed.

No infective disease reported from the other districts.

J. M. SINCLAIR,

Chief Veterinary Surgeon.

Notes on the Inoculation of Imported Cattle.

By LL. E. W. BEVAN, M.R.C.V.S., Government Veterinary
Bacteriologist.

The following report on the inoculation against redwater and anaplasmosis of the cattle imported from England by the Estates Department is of general interest :—

Forty-four animals were received at the Letombo Inoculation Camp on 23rd May, 1912. It was at once recognised that most of them were unsuitable for artificial inoculation, but at the special request of the Estates Department they were submitted to the process.

Of these 44 animals, 2 were shot on account of tuberculosis; 1 died from accident, leaving :—

41, *i.e.*, { 4 bulls to be inoculated
 { 15 heifers " "
 { 22 cows " "

Of those.

17 { 2 bulls died of anaplasmosis and complications
 { 5 heifers " " "
 { 10 cows " " "

That is :—

4 bulls	{	2 died {	age 3 years, very fat
		" 2	"
		2 lived {	" 15 months, not very fat
		" 18	"
15 heifers	{	5 died—	all in calf
		10 lived {	1 in calf
		" 9	not in calf
		10 died—	5 in calf, average age 5 years
22 cows	{	6	not in calf
		12 lived {	3 in calf, aborted and lived
		" 3	in calf, lived

Again,

Of the 22 cows { 8 were heavy in milk
4 were giving some milk
10 were dry

Of the 8 heavy in milk { 5 lived
3 died

Of the 4 giving some milk { 3 lived
1 died

Of the 10 dry { 4 lived
6 died

TRYPAN BLUE.—

Of 42 animals { 30 received T.b. { 1 died from accident
16 died from anapl. and comp.
13 lived
12 did not { 1 died calving
11 lived

or, of 17 animals which died from anaplasmosis and complications, all had received trypan blue. Of 24 animals which lived, 11 had received no trypan blue during the first reaction.

From the above figures certain deductions may be drawn.

1. AGE.—As shewn by the young bulls and heifers, the maximum limit of safety is under 18 months. But I may here point out that it is not desirable to import animals much younger than a year, because I have found that imported bulls do not "grow out" in Rhodesia as they do in Great Britain, and the benefit of better growth on home pastures should not be lost.

2. FAT, as adipose tissue, is a very serious disadvantage, as is well seen in the case of the bulls and some heifers.

Contrary to what would have been expected, the mortality was greater in dry cows than those heavy in milk. The explanation may be that the latter were "laying on" fat preparatory to the period of milking.

3. PREGNANCY constitutes a great danger, especially in its early stages. In those animals carrying a well-developed foetus the dead calf constitutes a mechanical stimulus, giving rise to abortion, and the mother's life is saved, although owing to retention of the foetal membranes it is doubtful whether such cows will be of use for breeding purposes for some time.

Many of the heifers were "served" before leaving England. This proved disastrous, and should be borne in mind when ordering females—they must be barren.

4. IN-BREEDING for type or show purposes undoubtedly reduces constitutional vigour and vitality. As the result of experience with some 300 imported animals made up of Short-horns, Herefords, Sussex, Devons, Polled Angus, Red Polls and Colonial animals, I venture to claim that from appearance alone I can foretell the severity of reaction likely to follow inoculation.

It is a matter of nature against artificial types.

A "rough" animal is not of necessity a bad one.

The following animals have been recently inoculated with the same virus as the Estates' animals, with but 1 death.

12 yearling Friesland heifers at Pomona (a tick free farm), all reacted.

1 yearling Friesland bull from same farm.

2 Hereford bulls *ex* Great Britain, soft and forced. One died.

2 Devon bulls.

6 Sussex heifers.

4 Sussex bulls.

4 Colonial Shorthorns.

1 Colonial Red-poll bull.

—

32 animals—1 death.

Several others under inoculation are not included, but give no cause for alarm.

TRYPAN BLUE.—The figures in relation to this drug are somewhat disconcerting. I have always maintained that an agent which exerts such a profound effect upon every body-cell must seriously influence the system. It is possible that the hæmopoietic organs are especially affected, and regeneration of the blood interfered with. This drug should only be used at the right time and under the direction of a veterinarian.

I am inclined to think that it has a harmful effect upon a foetus, and delays sexual vigour in a bull.

Agricultural Report.

Shortage of food consequent upon the deficient rainfall last season has occasioned considerable hardship amongst natives, and in order to prevent actual starvation the Government has transported grain to the afflicted districts. Considerable movement of stock has been necessary in order to provide grazing, but although there has been a fairly heavy mortality the unprecedented conditions have been weathered remarkably well. In parts of Makoni deaths have occurred owing to cattle, for lack of food, eating poisonous matter, but this is a frequent trouble at this season of the year. Winter crops generally are poor, and in consequence vegetables are dear, while fodder has been difficult to obtain even at very high prices.

Tobacco growers are busy preparing seed beds, and if a favourable season is experienced there will be a large increase in the acreage under this crop.

Wild carnivora have been very troublesome in Mashonaland, lions in particular being very bold this year, causing no small loss by their depredations.

In various parts of Matabeleland natives have ploughed in anticipation of early rains, which are fervently hoped for everywhere.

Cattle in the Gwelo district have had a bad time both from lack of grazing and water, most of the rivers having dried up.

In anticipation of an early season, numbers of local natives are leaving work and returning to their kraals for the purpose of cultivating their lands, hence farm labour is again beginning to become scarce, and that at the very time the farmer is wanting to prepare the land for his crops. This is an annual occurrence and a deterrent factor with local as distinct from northern labour. The indigenous native is willing to return to the farms after the busy season is over, when there is often a surplus.

The evil of veld burning increases instead of diminishing, and is more severely felt as the numbers of live stock and of farmers in the country increase. The whole subject is fraught with difficulties, but the present position is intolerable, and a very general source of grievance and loss.

The only district in which veld burning is less apparent this season than usual is Insiza, where the matter has received more attention than elsewhere.

Garden Calendar.

By N. L. KAYE-EDDIE.

THE FLOWER GARDEN.

November.—All seeds may now be planted. Annuals for January flowering should be sown, amongst which the following will be found to do excellently in this country :—Balsam, Calliopsis, Centurias, Chrysanthemum, Dianthus, Eschscholtzia, Marigold, Mignonette, Gallardia, Phlox, Nasturtium, Nigella, Verbena and Zinnia. These are all hardy and may be sown in the open either in beds or in the position desired for flowering. Advantage should be seized after each shower of rain during this month to keep the soil well worked and loose.

THE VEGETABLE GARDEN.

November and December.—All vegetable seeds may be sown during these months. Tomatoes and early peas and beans should be staked. The soil should be kept loose and free from weeds, which now get troublesome.

Sow Pumpkin, Mealies, Peas and Potatoes.

Market Reports.

The produce market at Salisbury is fairly well supplied, with the exception of munga, Kaffir corn, monkey nuts and beans, which are practically unobtainable. Potatoes are very scarce, the winter crop having failed, and supplies have to be obtained from the south. Prices will go higher until the new season's crop is marketed. As will be seen from the prices in the tables below, potatoes are realising high prices throughout South Africa. Mealies here are very steady and the price is good. The new crop of onions is expected this month, and high prices will probably be realised, as the demand is very steady. The new crop of oat forage is just to hand, and from what can be gathered supplies are going to be plentiful this season. Vegetables are very scarce at the morning market in Salisbury, while the quality of the produce is none too good.

There is a big demand for breeding cattle throughout Mashonaland, and large numbers of heifers are being imported from the south. Stock sales in any part of the Territory are very scarce, but when any are held high prices are realised.

The cattle sale held at Gwelo on the 29th August was a pronounced success. A large number of buyers from a wide area attended, and there was a keen demand for every description of stock. A noticeable feature was the desire of buyers to purchase well bred animals. Cows fetched up to £35; two-year heifers, £18 to £22 10s.; yearlings (from 8 to 11 months), £8 10s. to £11 10s.; Mashona cattle, up to £11; very poor and old beasts, £5 to £7; yearling oxen, £4 10s. to £5; slaughter oxen, according to weight, £9 10s. to £12 10s., or about 45s. per 100lbs.

From the morning of the 28th until the evening of the 31st over £7,000 worth of cattle changed hands.

The following are average quotations :—

Article.	Johannesburg.		Kimberley.		Bulawayo.		Salisbury.	
Barley, 150 lbs.	8/0	10/6	9/0	10/0	—	—	30/0	32/6
Beans, 203 lbs.	29/0	32/0	27/0	30/0	—	—	—	none
Boer Meal, unsifted, 200 lbs.	—	—	20/0	21/0	40/0	41/0	37/6	40/0
Bran, wheaten, 100 lbs.	5/0	5/6	5/9	6/3	14/0	14/6	15/0	16/0
Flour, 100 lbs.	—	—	—	—	25/6	26/6	20/0	26/0
„ Colonial, 100 lbs.	—	—	13/6	14/6	22/0	22/6	—	none
Forage, 100 lbs.	3/0	4/6	2/9	3/3	10/6	12/0	8/6	10/0
„ Colonial Oat	5/9	6/0	—	—	—	—	—	none
	Bale.				Ton.		Ton.	
Hay	9d.	1/0	—	—	60/0	65/0	40/0	50/0
Kaffir Corn, 200 lbs.	15/0	16/0	15/6	17/6	—	—	—	none
Manna, 100 lbs.	3/0	3/6	—	—	—	—	4/6	5/0
Mealies, S.A. White, 203 lbs.	9/9	10/6	10/3	10/6	18/6	19/0	15/6	16/0
Mealies, Yellow, 203 lbs.	9/3	9/9	—	—	17/6	18/6	—	none
Mealie Meal, White, 200 lbs.	—	—	10/6	11/0	—	—	15/6	16/0
Munga, 200 lbs.	—	—	—	—	—	—	—	none
Monkey Nuts, bag	—	—	—	—	17/6	18/6	—	none
Oats, 150 lbs.	7/0	8/0	8/0	9/0	20/0	20/6	22/6	25/0
Onions, 120 lbs.	13/6	14/6	—	14/0	22/6	23/0	30/0	35/0
Peas, 200 lbs.	20/0	22/0	—	—	—	—	—	none
Potatoes, new, 150 lbs.	20/0	24/0	19/6	22/6	—	—	—	—
„ 150 lbs.	15/0	18/0	14/6	16/6	31/0	32/6	35/0	40/0
Rapoko	—	—	—	—	—	—	—	—
Rye, 200 lbs.	11/0	11/6	—	—	—	—	—	—
Salt, 200 lbs.	—	—	—	—	10/6	11/0	14/6	15/0
Wheat, 203 lbs.	13/6	18/0	20/6	21/6	—	—	—	—
Butter, local, per lb.	11½d.	1/4½d.	1/0	1/6	1/6	1/10	1/6	2/0
Eggs, local, per dozen	10½d.	11½d.	9d.	1/1	1/3	1/6	2/0	2/6
Ducks, each	2/6	3/6	2/6	3/6	—	—	3/6	4/6
Fowls, each	1/6	4/6	1/3	2/6	1/1	2/2	3/0	7/6
Geese, each	3/9	4/0	3/0	4/0	—	—	7/6	10/6
Turkeys, cocks, each	8/0	15/0	8/6	10/6	—	—	11/0	14/0

LIVE STOCK.

Slaughter Cattle, 100 lbs.	23/0	24/6	—	—	37/6	42/6	35/0	40/0
Trek Oxen, trained	£8/10	£9/10	£7/10	£8/10	£8/10	£11/10	£10	£12/10
Local Cows, milk	—	—	£7	£8/5	£17/10	£22/10	£15	£20
Dairy Cows	£16	£35	—	—	£25	£35	£25	£35
Native Cows	—	—	—	—	—	—	—	—
Heifers, Colonial	£5	£7/10	—	—	£8	£17/10	£9	£12/10
„ Native	—	—	—	—	—	—	£7/10	£8
Pigs, live weight	1½d.	3½d.	2d.	3d.	3d.	4d.	4d.	—
Horses, riding, salted	—	—	—	—	—	—	£20	£35
„ „ unsalted	£10	£21/10	£10	£25	£25	£40	£16	£35
Mules, inoculated	£8	£35	£18	£25	£35	£40	£19	£35
Donkeys, geldings	£5/10	£7/10	£5	£7	£7	£8/10	£3	£7
„ mares	—	—	£6	£7/10	£8/10	£10/10	£7/10	£8/10
Goats	16/0	24/6	—	12/6	—	—	20/0	22/6
Persian Ewes	—	—	—	—	18/6	22/6	20/0	23/6
Cross-bred Ewes	—	—	—	—	—	—	20/0	22/6
Sheep, slaughter	—	—	17/6	25/0	22/0	25/6	22/6	25/0

Weather Bureau.

TEMPERATURES.

STATION	JULY		AUGUST	
	Max.	Min.	Max.	Min.
MASHONALAND—				
Chishawasha	70·7	40·9	75·2	43·3
Chiconga's Location, Old Umtali	71·6	45·6	76·9	47·2
Giant Mine, Gadzema	72·8	47·0	77·6	48·3
Hallingbury Farm, Hartley	72·2	43·0	77·2	44·0
Melsetter	61·2	—	66·4	—
Mount Selinda, Melsetter	63·5	46·0	67·3	47·2
Salisbury Gaol	68·2	40·8	73·2	43·5
Sinoia	74·1	39·6	79·1	44·2
Summerfield, Umtali	62·6	43·4	68·9	44·7
Victoria	68·0	40·5	—	—
MATABELELAND—				
Bulawayo	66·2	43·6	72·6	46·5
Empandeni	68·6	40·5	74·8	43·6
Gwelo	68·2	40·7	72·8	42·2
Rhodes Matopo Park	65·9	40·7	71·5	44·1
Tuli	74·0	41·3	82·9	46·6
Victoria Falls	76·6	41·3	82·1	43·8

RAINFALL.

STATION	July	August
MASHONALAND—		
Banket Junction (Railway)	Nil	—
Chishawasha	0·06	0·20
Chiconga's Location, Old Umtali	0·20	0·02
Darwin	Nil	Nil
Eldorado (Railway)	Nil	—
Enkeldoorn	Nil	Nil
Gatooma (Railway)	Nil	—
Giant Mine, Gadzema	Nil	Nil
Goromonzi	Nil	0·46
Hartley {	Ardgowan	Nil
	Hallingbury Farm	Nil
	Shagari	Nil
	Railway	—
Lomagundi (Lone Cow Estate)	Nil	—
Macheke (Railway)	Nil	—
Makoni (Eagle's Nest)	0·11	—

RAINFALL—(Continued).

STATION			July	August
MASHONALAND—(Continued)				
Marandellas	...	...	0·03	—
Marandellas	{ Bonongwe	...	0·03	—
	{ Land Settlement Farm	...	Nil	—
	{ Railway	...	Nil	—
	{ Tweedjan	...	Nil	Nil
Melsetter	...	...	1·30	0·29
Melsetter	{ Chipinga	...	0·97	—
	{ Mount Selinda	...	1·25	1·26
	{ Vermont	...	1·19	1·68
Mrewa	...	...	0·07	0·05
Mtoko	...	...	Nil	—
North Melsetter (Tom's Hope)	...	...	0·26	0·40
Norton Siding (Elandsfontein)	...	...	Nil	Nil
Odzi (Champion Mine)	...	...	—	0·01
„ (River Junction)	...	...	Nil	0·11
„ (Selim Mine)	...	...	0·13	0·02
Rusape (Railway)	...	...	0·30	—
Salisbury	{ Avondale	...	0·15	0·05
	{ Cleveland Reservoir	...	0·18	0·01
	{ The Meadows	...	Nil	0·84
	{ Gaol	...	0·06	Nil
	{ Railway	...	Nil	—
Shamva	...	...	0·05	—
Sinoia	...	...	Nil	Nil
„ (Palm Tree Farm)	...	...	Nil	Nil
Umtali	{ Summerfield	...	0·49	0·12
	{ Mutambara Mission	...	0·11	Nil
	{ Railway	...	0·43	—
	{ Utopia	...	0·23	0·76
Victoria	...	...	0·33	—
Victoria	{ Empress Mine	...	0·04	Nil
	{ Gokomere	...	0·45	Nil
	{ Gutu	...	0·28	1·85
	{ Morgenster	...	1·11	0·17
	{ Noeldale	...	Nil	0·09
	{ Halliday's Farm	...	0·37	Nil
	{ Marthadale	...	0·33	Nil
	{ Silveroaks	...	0·28	Nil
Inyanga (York Farm)	...	...	0·15	0·17
MATABELELAND—				
Balla Balla (Railway)	...	...	0·15	—
Battlefields	„	...	Nil	—
Bembesi	„	...	Nil	—
Bulawayo	{ Observatory	...	0·01	Nil
	{ Railway	...	0·01	—
Empandeni	...	...	Nil	Nil
Essexvale	...	...	0·01	Nil
Figtree	...	...	Nil	Nil
Filabusi	...	...	Nil	Nil
Fort Rixon	...	...	Nil	Nil

RAINFALL—(Continued).

STATION		July	August
MATABELELAND—(Continued)			
Globe and Phoenix (Railway)	...	Nil	—
Gwaai (Railway)	...	Nil	—
Gwanda „	...	Nil	—
Gwelo	...	0·03	Nil
Gwelo {	Lalapanzi	0·11	0·03
	Lower	Nil	Nil
	Railway	Nil	—
	Shawlands	0·02	Nil
Heaney Junction (Railway)	...	Nil	—
Insiza {	Dawn Farm	0·02	Nil
	Infiningwe	0·21	Nil
	Railway	Nil	—
Kariyangwe	...	Nil	Nil
Khami	...	—	Nil
Lochard Experiment Farm	...	Nil	Nil
Malindi (Railway)	...	Nil	—
Mangwe (Garth)	...	0·05	0·01
Mazunga	...	Nil	Nil
Mpondeni	...	Nil	—
Nyamandhlovu	...	Nil	—
Rhodes Matopo Park	...	0·02	Nil
Selukwe	...	0·32	—
Solusi	...	Nil	Nil
Syringa	...	Nil	—
Tuli	...	Nil	Nil
Umvuma {	Driefontein	0·26	Nil
	Grootfontein	0·30	Nil
	Railway	Nil	—
	Rhodesdale Estate	0·15	Nil
Victoria Falls	...	Nil	Nil
„ „ (Railway)	...	Nil	—
Wankies {	Hospital	Nil	—
	Railway	Nil	—
West Nicholson (Railway)	...	0·03	—

Dates of Meetings of Farmers' Associations, Southern Rhodesia

(SUBJECT TO ALTERATION)

DATES OF MEETINGS OF FARMERS' ASSOCIATIONS.

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Name of Association	Place of Meeting	Secretary	1912		
			Oct.	Nov.	Dec.
Charter—Ngezi	Beatrice Mine and Ngezi River alternately	W. Krienke	..	27	..
*Central	Unvuma and Enkeldoorn	R. Altons	26	30	28
Chipinga	Chipinga	L. Dobell	31	..	..
Enterprise	Arturus	Jas. Watson	9	12	10
Figtree Branch, R.L. and F.A.	Figtree Siding	A. Curtis	..	9	..
Gatooma	Gatooma	..	12	..	14
Gezaland	Lower Melsetter	..	3	..	..
Hardley	Hardley	Lionel Gohell	5	9	7
Headlands	Headlands	H. F. Savory	..	30	..
Inisiza	Inisiza Station and Peggy Store	H. Barnes Pope	..	..	..
Kimberley Reefs	Kimberley Reefs	W. B. Harris	13	10	8
Lalapanzzi	Lalapanzzi	G. P. Watermeyer	19	16	21
Louagundi	Sinoia	B. Snit	..	10	..
Macheke	Macheke	J. G. Roberts	..	2	..
Makoni	Rusape	H. H. Kidson	5	2	..
Makwiro	Makwiro	W. S. Tapsen	7	4	..
Manica	Xmas Pass Hotel	A. B. Fraser	19	16	21
Marandellas	Marandellas and Settlement Farm	..	5	2	..
Marrila	Marula Siding	G. M. Wright	11	8	..
Mashonaland	Salisbury	MacW. Ingram	19	16	21
Matopo Branch, R.L. and F.A.	Matopos Terminus Hotel	W. H. Williamson	..	..	..
Mazoe	Mazoe	W. E. Dowsett	..	..	..
Melsetter (North)	Various Farm Houses	G. Noakes	..	..	..
Midlands	Gwelo	N. N. Rutherford	12	9	7
Northern Untali	Farm "Jerain"	M. L. Price	..	..	..
Plumtree	Plumtree	A. Tulloch	11	..	..
Que Que	Bulawayo	Chas. Atkinson	25	29	27
Rhodesian Landowners and Farmers	..	A. J. Bowman	..	..	..
Shamva	Farm "Fairview"	Harry Hopkins	5	2	7
Somalnia and Shangani Flats	T.Mamburra Mission	G. M. Mowbray	..	..	..
Unvumvuma	Victoria	S. Annandale	..	..	..
Victoria	Victoria	N. N. Rutherford	10	20	18
		J. Rutherford	..	..	..

* Headquarters at Unvuma. One Meeting in each quarter held at Enkeldoorn.

Departmental Notices.

Information for Farmers

The Department of Agriculture is prepared to furnish to farmers technical advice either by correspondence, or, where possible, by personal visits. All communications should be addressed in the first instance to the Director of Agriculture.

Crops

The Agricultural Branch deals with enquiries relating to agricultural practice, soils, crops, cultural operations, processes, seeds, trees, farm implements and machinery, etc.

Poisonous Plants

It is of great importance that as soon as possible a study should be made of those plants found in Southern Rhodesia which are poisonous or deleterious to small or large stock. Farmers and others who have known, or suspected poisonous plants on their property, are requested to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, at the same time forwarding specimens of the plant, including stem, leaves, flowers, and, where possible, fruit. Any particular regarding the habits of the plant will be welcomed, and in return the Department will supply all available information regarding the plants.

Disposal of Seeds

All farmers and others who have surplus supplies of good quality locally grown farm seed of any description are invited to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, stating what

quantities are available for sale, and price f.o.r. nearest station. In all cases representative samples of the grain must accompany the letter, but need not exceed two ounces in weight.

The Agricultural Department is continually receiving enquiries as to where various seeds can be obtained, and it is hoped that by the above means growers of reliable seed may be brought into touch with one another.

It must be clearly understood, however, that beyond recommending sources of supply, the Department cannot take any further part in the transaction.

Sale of Paspalum Plants

Roots of this valuable winter pasture grass, suitable both for moist and dry situations, will be available for sale from December onwards at the rate of 5s. per 1,000 slips f.o.r. Salisbury. A root can be broken up into from thirty to fifty or more slips and, when ordering, the number of slips required should be stated. Applications, accompanied by remittance, to be addressed to the Government Agriculturist and Botanist, Department of Agriculture, Salisbury.

Tobacco

The services of the Tobacco Expert are available to all desiring advice on the subject. Applications should be accompanied by particulars of the nature of the information sought, also the distance and direction of the farm from some well known centre.

The Department of Agriculture is distributing in small quantities a few varieties of Virginia, Turkish and Cigar leaf tobacco seed to farmers for experimental purposes. Application for the seed should be made to the Tobacco Expert, Department of Agriculture, Salisbury. Tobacco seed for ordinary crop requirements is sold by the Tobacco Company of Rhodesia and South Africa, Limited, and application should be made to the Manager, Tobacco Warehouse, Salisbury.

Live Stock

The Animal Industry Branch is prepared to advise with regard to all matters connected with stock breeding, selection and feeding of stud animals, the dairy industry, poultry management, farm buildings for stock, and kindred subjects. Buyers and sellers of stud stock in Rhodesia are also put in touch with one another.

Purchase of Stock in the Cape and Free State Provinces of the South African Union, on behalf of Farmers resident in Southern Rhodesia

The following amended arrangements are published for general information :—

The Government undertakes the purchase of pure-bred live stock for farmers on the conditions outlined below, and on the following terms of payment, viz. :—(1) a deposit on application ; (2) one-third total cost on delivery, less amount of deposit ; (3) one-third after six months, and (4) one-third after twelve months—both these instalments bearing interest at 6 per cent. or 10 per cent. if not paid at due date. These terms of credit will only be allowed on purchases up to a total maximum value of £200 ; sums exceeding that amount are payable in cash along with the first instalment. The Government reserves the right to refuse, without reason given, applications, or to fulfil purchases even after deposit has been made. Applications must be on the prescribed Form "A," and all conditions complied with before same is registered. Applications will be considered in rotation, but fulfilled as opportunity serves, so that animals may be procured as cheaply as possible. The buyer must undertake to accept the animal allotted to him, unless it fails to satisfy description as given in the application form. Disputes may be submitted to arbitration. The purchase price will include all expenses up to time of delivery, price paid to original owner, commission and charges of buyer and freight, including, where necessary, attendance and keep on journey. With every application a deposit must be forwarded ; £1 per head in the case of cattle, horses and donkeys, and 5s. per head for sheep, goats and pigs. Such deposit will

be deducted from the amount of the first instalment due, but may be forfeited in the event of the application being withdrawn after having been registered. Stock is not to be disposed of without the written consent of the Director of Agriculture until payment is completed.

Purchases will be made by the Department of Agriculture through its authorised representatives. Every effort will be made to secure animals in accordance with particulars furnished by applicants, and to the best advantage. All purchases must conform strictly to the importation regulations as regards age and freedom from contact with contagious disease. Pedigrees, if obtainable, will be supplied. The Government will bear all risks of transport and of death from any cause until delivery, all losses being chargeable to the vote. All animals failing to pass the necessary test on arrival shall be destroyed and the loss borne by the Government, and another animal purchased for the applicant.

Prospective buyers will be advised of the probable cost. The Department does not undertake to purchase stock at precisely the prices specified by applicants, but will endeavour to approximate as nearly as possible to the figures given and not to exceed same by over 20 per cent. The authorised representatives of the Department will be allowed a reasonable commission, with expenses additional.

The first instalment will become due and payable on delivery. Applicants or their agents will be advised regarding arrival of their stock, after which all responsibility on the part of the Department will cease.

Owing to the present outbreak of foot and mouth disease in Great Britain and Ireland, the purchase of all stock from there is suspended.

Entomology

The Government Entomologist advises on matters connected with insect pests of live stock, crops, and fruit trees, and also undertakes the inspection of nurseries and of the importation of plants from abroad.

Chemical Analyses

The Government Agricultural Chemist deals with matters relating to the composition of soils, fertilisers, farm produce of vegetable or animal origin; also the investigation of poisons and of articles of potential economic value.

Nominal charges are made, which, while not covering the cost, will help to defray the expense and serve as a proof of good faith. Samples, carriage prepaid, together with full particulars regarding the subject should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

A schedule of charges and directions for taking samples will be furnished on application.

With all analyses, reports will be furnished explanatory of the results and, when possible, advice given as to the nature, properties and value of the material.

No charge will be made for analysis where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Services of Government Veterinary Surgeons

1. The services of Government Veterinary Surgeons are available to the public, free of charge, for the following purposes only :—

- (1) Attending and giving professional advice in connection with the following diseases, viz. :—Anthrax, Contagious abortion, East Coast Fever, Epizootic Lymphangitis, Foot and Mouth Disease, Farcy, Foot-rot, Heartwater, Glanders, Intestinal parasites amongst sheep and goats, Liver Disease, Lung-sickness, Osteo Porosis, Malarial Catarrhal Fever (blue tongue), Rabies, Redwater, Rinderpest, Scabies, Sponziekte (quarter evil), Swine Fever, and any other diseases which may in future be scheduled in terms of section 3, sub-section 18 of the "Animals Diseases Consolidation Ordinance, 1906." Attending to cases of disease amongst live

stock which, though not of a contagious or infectious character, may be of general public importance.

- (2) Applying tests in regard to Glanders, Tuberculosis, or any other disease against the introduction or spread of which tests are applied under regulations.

- (3) Inoculations against the following diseases :—

Horsesickness, Lung sickness, Anthrax, Quarter Evil, Redwater, Malarial Catarrhal Fever (blue tongue). A fee to cover the cost of serum and virus will be charged.

2. The following charges shall be made and payable for services rendered by the Government Veterinary Surgeons in other cases, viz. :—

	£	s.	d.
(1) For every professional visit within three miles of his office or residence	5	0	0
(2) For every professional visit beyond such distance	0	10	6
plus an additional charge of 2/6 per hour whilst engaged in such visits or £2/2/0 a day of 24 hours ;			
(3) For advice given at the Veterinary Surgeon's office, for each animal, per visit	0	2	6
(4) The following to be charged in addition to visiting fees :—			
a. For every examination as to soundness, each	1	1	0
b. For castration, horses, each	1	1	0
c. For castration, bulls, each	0	5	0
d. For castration, donkeys, each.. ...	0	10	6
e. For parturition cases, mares, each	2	2	0
f. For parturition cases, cows, each..	1	1	0
g. For other operations, according to nature, from 5/- to £2/2/0.			

3. Double the above fees will be payable for services rendered on Sundays, public holidays, and between the hours of 7 p.m. and 7 a.m.

4. Applicants for the services of Government Veterinary Surgeons must at their own cost provide the necessary transport for the conveyance of these officers from, and back to, their residence or nearest railway station.

5. Farmers and owners of stock throughout the country frequently telegraph for a Government Veterinary Surgeon to be sent to attend an animal which has been taken seriously ill. It is rarely possible to comply with these requests at once, as the Veterinary Surgeon may be engaged on duty which he cannot leave, or is at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any service in an urgent case. Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the veterinary staff discredited. To obviate this, in all cases where veterinary advice and assistance are required, the owner should telegraph to "Veteran," Salisbury, with prepaid reply, the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible. This will enable the Chief Veterinary Surgeon to telegraph advice at once and state whether he is able to arrange for veterinary attendance on the case or not, and save valuable time, which is always of importance in acute cases.

6. The services of Government Veterinary Surgeons will only be available for private work with the consent of such officers, and when such work does not interfere with their official duties, or when the services of a private practitioner are not available.

7. As the arrangement of allowing Government Veterinary Surgeons to attend to private cases is intended purely for the benefit of farmers and stock-owners who may wish to obtain professional advice, no responsibility whatever will be accepted for any loss of stock, etc., which may result from the negligent treatment or advice, or wilful default, of any Government Veterinary Surgeon.

8. All fees collected in terms of these Regulations are payable to the Treasury through the local Receiver of Revenue.

Sale of Dip

With a view to enabling farmers to obtain dipping material at as low a rate as possible arrangements have been made whereby orders may be placed with any officer of the Veterinary Department for the purchase of supplies of Messrs. W. Cooper & Nephew's cattle dipping fluid, adapted for three-day, five-day or less frequent dipping. The price is at the rate of five shillings per gallon delivered at any siding or station desired for quantities of not less than ten gallons. Applications must be accompanied by remittances, without which they cannot receive attention. Coin or stamps will not be accepted. This dip is in use at all Government dipping tanks.

Dipping Tanks—Grants in Aid

The Government is prepared to assist farmers in the construction of private dipping tanks by a grant in aid on the £ for £ principle, but not to exceed, however, a total sum of £50.

This grant will only be paid to approved applicants, and after the tank has been inspected by an official appointed for this purpose and found suitable, and on production of receipted accounts in support of their claim.

Applications cannot be considered for grants in aid of tanks already constructed, and those wishing to avail themselves of this assistance should apply beforehand to the Director of Agriculture, from whom full particulars, together with plans and specifications, can be obtained.

Sale of Virus

It is notified for public information that redwater and gall-sickness (*anaplasmosis*) virus may be obtained from the Veterinary Department, Salisbury, at a charge of ten shillings per dose.

Solutions of trypan blue and the injection used in the treatment of *trypanosomiasis* (fly disease) of cattle may also be

obtained at a charge of five shillings per dose and blue tongue virus at one shilling and sixpence per dozen doses.

No material will be issued unless a remittance accompanies the order.

Irrigation

From the Agricultural Engineer assistance may be obtained by farmers for the following :—

1. In the locating of possible irrigation projects.
2. In the preparation of surveys or plans and for irrigation works, including weirs, dams, furrows, pumping plants, and determining the extent of land which may be brought under irrigation schemes, together with rough estimates of costs.
3. In the supervision of construction and carrying out of projects.
4. In the selection of suitable sites for boring operations.
5. Preparing specifications, etc., regarding pumping plants, windmills, and agricultural machinery.
6. Giving general advice on cognate subjects.

Informal advice of a general character will be given to applicants making enquiry by letter or in person. Any applicant desiring professional assistance likely to occupy more than one day should apply for advice in writing. All applicants should specify clearly the nature of the project on which they seek advice, and should give full particulars as to the distance and direction of their farms from some well-known centre. Applicants will be required to provide suitable means of transport for the officer concerned during the period devoted to work on the spot; to provide any unskilled labour that may be required; and to provide for any other contingent services. Applications should be addressed to the Director of Agriculture, who will endeavour to arrange visits as far as possible in order of application, but with due regard to situation, in order to obviate unnecessary travelling and delay. The services of the Agricultural Engineer are given free, but in cases demanding prolonged individual attention, or repeated supervision, a charge may be made according to circumstances.

Samples

In connection with enquiries, especially with regard to diseases amongst crops, insect pests, soils, grain and the identification of plants, specimens should, wherever possible, be sent, together with full details. It is found that such parcels are often forwarded without any indication of where they are from or why they were sent and it is difficult in such cases to trace the sender. It is, therefore, requested that persons when forwarding samples for examination, indicate clearly their names and address on the package, so as to enable their requirements to be attended to without delay.

Employment on Farms

The Department of Agriculture receives numerous enquiries from persons of varied attainments, age and financial position for openings on farms, as managers, assistants and learners, requiring remuneration on corresponding scales, or willing to give services in return for keep.

In order that work may be found and needs of farmers met, applications are invited from both employers and artisans, such as masons, bricklayers, carpenters, fencers, well sinkers, concrete workers, and the like. In cases where employers have obtained the labour they require, or applicants for employment have found work, it is requested that notification be at once sent to the Department of Agriculture, in order that unnecessary correspondence be avoided.

Destruction of Wild Carnivora, etc.

1. It is hereby notified for public information that rewards for the destruction of wild carnivora, etc., will be paid on the scale and conditions herein set forth.

2. Rewards will be paid as follows :—

For each lion	£5	0	0
For each leopard	1	0	0
For each cheetah	1	0	0
For each hyæna... ..	0	10	0

For each wild dog... ..	£0 10 0
For each baboon	0 2 6
For each crocodile not less than 3 feet in length	0 10 0
For each crocodile over 1 and less than 3 feet in length ...	0 2 0
For each crocodile under 1 foot in length	0 0 6
For each crocodile egg.... ..	0 0 6

3. Rewards will be paid to Europeans by the Magistrate or Native Commissioner, of the district, within three months of the date upon which the animal is killed, on a solemn declaration on the prescribed form.

4. In proof of destruction, applicants for rewards will be required to produce and surrender in the case of a leopard or cheetah the skin with the tail unsevered, and in the case of a hyæna, crocodile, wild dog or baboon the unskinned head. In the case of a lion to produce the skin and skull, the skull only to be surrendered.

5. The skins and heads surrendered for rewards shall become the property of the Government and shall be disposed of in such manner as may be decided on.

Lectures for Farmers

The services of certain of the officers of the Department of Agriculture and the Veterinary Department are available for purposes of delivering lectures on subjects upon which they have special knowledge. As far as practicable, lectures will be accompanied by demonstrations at the time or subsequently in the field. Owing to the many calls on the time of the staff and the exigencies of their duties, alternative dates are desirable in order to avoid disappointment. The following topics are offered as examples of subjects that may be dealt with in this manner, but the suggestion of other themes is invited.

Agriculture.—Maize growing; Maize selection and maintenance of the breeding plot; Points of maize and maize judg-

ing, with demonstrations; Utilisation of granite vlei soils; Ground nut culture; Rotation crops for home use and for sale; Veld improvement by winter grasses; Production of foodstuffs for the mines; Ensilage; Fungoid diseases of maize and wheat; Wheat, oats and lucerne under irrigation; The prospects of cotton culture in Southern Rhodesia.

Veterinary Hygiene.—Detection and prevention of disease; The care of live stock.

Live Stock.—Judging of cattle according to breeds, and for beef, milk and draught; feeding and kraaling of live stock; general principles of cattle breeding; management of imported stock; grading up of native or local stock with pure bred bulls.

Dairying.—Home butter-making; building and equipment of a farm dairy; handling and marketing of milk; packing and marketing of butter; construction of cow houses.

Swine Husbandry.—Breeding and feeding of swine; some suggestions for the production of first-class bacon pigs; construction of piggeries at moderate cost.

Chemistry.—The principles of soil fertility; the principles of manuring; the value of lime in agriculture; chemistry of milk and its products (accompanied by demonstrations in milk-testing).

Entomology.—Economic entomology on the farm; the role of insects and their allies in the transmission of disease; scale insects and fruit trees and methods for their control; insect pests and maize; enemies of the potato, insect and fungus; the value and objects of plant import and nursery regulations.

Irrigation.—Methods of applying water to land for irrigation; the measurement of water in connection with irrigation; canal irrigation; storage reservoirs; hints on the selection of sites and on the design of earthen and other dams; irrigation by pumping, with notes on the selection of plants.

Enquiries and invitations should in the first instance be addressed to the Director of Agriculture, Salisbury.

Abstract

tion free of charge to applicants in Rhodesia:—

E. _____

- No. 99. Bean Crops, by H. Godfrey Mundy, F.L.S.

S.

- No. 116. Auxiliary Crops in Arable Farming

ENTOMOLOGY AND VEGETABLE PATHOLOGY.

- No. 46. The Head Smut of Maize, by H. Godfrey Mundy, F.L.S.

- No. 52. Regulations affecting the Importation of Potatoes, by Rupert W. Jack, F.E.S.
- No. 66. Selection of Spraying Outfit, by R. W. Jack, F.E.S.
- No. 69. Resin Wash and Means of Applying It, by R. W. Jack, F.E.S.
- No. 75. Fumigation of Fruit Trees with Hydrocyanic Acid Gas, by R. W. Jack, F.E.S.
- No. 100. Tsetse—Preliminary Notes on the Habits of—by R. W. Jack, F.E.S.
- No. 120. Some Insect Pests of Maize, by R. W. Jack, F.E.S.

VETERINARY.

- No. 14. Bots in Equines, by R. Ferguson Stirling, M.R.C.V.S.
- No. 54. African Coast Fever, by Ll. E. W. Bevan, M.R.C.V.S. (revised edition).
- No. 51. Strangles, by F. D. Ferguson, M.R.C.V.S.
- No. 113. Anaplasmoses of Cattle, by Ll. E. W. Bevan, M.R.C.V.S.
- No. 114. Anaplasmosis of Sheep, by Ll. E. W. Bevan, M.R.C.V.S.
- No. 117. Ephemeral Fever or Three Days' Sickness in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.
- No. 118. Preparation of Blood Smears.
- No. 121. Rabies, by Ll. E. W. Bevan, M.R.C.V.S., and T. G. Millington, M.R.C.V.S., D.V.H.
- No. 49. Notes on Bovine Plasmoses of Southern Rhodesia, with special reference to Mashonaland, by Ll. E. W. Bevan, M.R.C.V.S.
- No. 50. Epizootic Abortion in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.
- No. 102. The Construction of Dipping Tanks for Cattle.
- No. 103. Dipping and Tick-Destroying Agents, by Lt.-Col. H. Watkins-Pitchford.
- No. 53. Animals Diseases Consolidation Ordinance, 1904.
- No. 82. Difficult Parturition of the Cow, by C. R. Edmonds, M.R.C.V.S.
- No. 91. Common Ailments of the Horse, by D. R. Chatterley, M.R.C.V.S.
- No. 80. Detection and Prevention of Diseases of Stock, by Ll. E. W. Bevan, M.R.C.V.S.
- No. 84. African Coast Fever—Diagnosis of Gland Puncture, by Ll. E. W. Bevan, M.R.C.V.S.
- No. 95. Oestrus-ovis in Sheep, by Alec King.
- Conditions under which Government Veterinary Surgeons' Services are available to the public.

MISCELLANEOUS.

Terms for Analysis by the Department of Agriculture, of Produce, Soils, Water, etc.

- No. 108. Lime Deposits in Rhodesia and their Value, by G. N. Blackshaw, B.Sc., F.C.S.
- No. 109. Rainfall in Relation to Dry Farming, by Rev. E. Goetz, S.J., Director of Bulawayo Observatory.

- No. 111. Special Railway Rates for the Benefit of the Farming Community.
- No. 83. Hints on Brickmaking, by G. S. Dyke.
- No. 37. Rural Education in Rhodesia, by G. Duthie, M.A., F.R.S.E.
- No. 63. Game Law : Summary of.
- No. 62. Services of Agricultural Engineer.
- No. 77. Animals Diseases Amending Ordinance, 1911.
- No. 90. Reports on Experiments—Experimental Station, Salisbury, 1910-1911, by J. H. Hampton.
- No. 10. Watering and Feeding of Live Stock on Railway.
- No. 93. Formation of Agricultural Credit Associations in Rhodesia, by Loudon M. Douglas, F.R.S.E.
- No. 96. Swine Breeds and Breeding of, by Loudon M. Douglas, F.R.S.E.
- No. 98. Pig Breeding and Feeding, by T. M. Rixon.
- No. 104. Stock Raising, by Otto Zimmerman.
- No. 105. Bacon Curing on the Farm, by Loudon M. Douglas, F.R.S.E.
Dipping Tanks—Grants in Aid.
Forestry—Sale of Seedling Trees.
- No. 110. Utility Poultry Keeping, for Amateurs and Beginners, by "Gallinule."
- No. 119. Some Notes on Charcoal Burning, by Eric A. Nobbs, Ph.D., B.Sc.
- No. 122. Notes on the Management of Dairy Herds, by R. C. Simmons.
- No. 123. Feeding and Care of Imported Bulls, by R. C. Simmons.

Government Notices.

ANIMALS DISEASES AMENDING ORDINANCE, 1911.

Ordinance No. 2, 1911.]

[Promulgated 17th March, 1911.

BE IT ENACTED by the Administrator of Southern Rhodesia, with the advice and consent of the Legislative Council thereof, as follows:—

1. So much of the "Animals Diseases Consolidation Ordinance, 1904" (hereinafter referred to as the said Ordinance) and of any other law as may be repugnant to or inconsistent with the provisions of this Ordinance is hereby repealed.

2. The Administrator may, on the outbreak of a destructive disease, or when there is suspicion of the existence of such disease, declare an area around and including the place where such disease exists, or is supposed to exist, actively infected for the purpose of this Ordinance.

3. Whenever an area shall have been declared infected in terms of the last preceding section, the Administrator may, for the purpose of suppressing or controlling disease, cause such fences to be erected along the boundaries of or across any farms or land situated in such area as he may deem necessary.

4. (1) If the landowner shall not pay the cost of erecting any fence as aforesaid upon completion thereof, the cost shall be defrayed in the first instance out of moneys provided by the Legislative Council.

(2) When any fence erected as aforesaid runs along the boundary of a farm, the cost of the erection of such fence shall, if not sooner repaid, be repaid, together with interest at the rate of £5 per centum per annum, by equal yearly instalments commencing two years after the fencing is completed, such instalments being so calculated and fixed that the said cost and interest shall be wholly repaid within a period of fifteen years from the date when the first instalment became due.

(3) Such repayment shall be made by the adjoining landowners whose land has been divided by the fence. Each such landowner shall pay one-half the cost of the dividing fence and interest as aforesaid. When the adjoining land is a native reserve, or a portion of such reserve, the one-half of the cost shall be paid from funds in the local Treasury of the British South Africa Company.

(4) When any fence as aforesaid shall be erected within, and not on and along, the boundaries of any farm, the cost shall be paid from the funds of the local Treasury of the British South Africa Company, and the fence when no longer necessary for the purpose for which it was erected may be removed by the British South Africa Company; provided that the landowner shall have the right to purchase such internal fence at a price representing the total cost of such fence.

(5) The term "owner" shall mean (a) the person registered as such in the office of the Registrar of Deeds, (b) the British South Africa Company in respect of native reserves, and (c) the local authority in respect of municipalities.

5. Where the bed of a stream or river lies immediately between or constitutes the boundaries of land owned by private owners, the fence may be erected on one or other bank of the river or stream and across it, or partly

on one bank, across it, and partly on the other bank, in such manner as may be agreed upon by the owners whose lands are separated by the said stream or river. The Administrator may call upon the said owners to agree to the position of the said fence on or before a date fixed by him, and, should they fail to do so, he may cause such fence to be erected without further reference to the said owners. For the purposes of repayment, such fence shall be considered as dividing the lands of adjoining owners, and half the cost shall be recoverable from each owner whose lands are separated by the said stream or river.

6. The Administrator may call upon any owner whose land has been fenced in terms of section 3 or 12 to provide sufficient security for the payment of any sums that may be due to the British South Africa Company in its local Treasury in respect of such fence. If the owner shall fail or refuse to provide such security, the Administrator may cause a notice in writing to be sent to the Registrar of Deeds of the amount due by such owner, and the Registrar shall make an entry thereof in respect of the land fenced. Such entry shall constitute an hypothecation of the land, ranking from the date on which the entry was made and for the amount therein stated; provided that the Registrar may pass transfer of land so hypothecated if the transferee agrees in writing that any sums due and unpaid shall remain and be registered as a charge against the said land.

7. When any land held under lease or permit of occupation has been fenced in terms of this Ordinance, during the term of such lease or permit the lessee or permit holder shall pay to the proprietor of such land yearly, during the continuance of the lease or permit of occupation, interest at the rate of £5 per centum upon so much of the cost of the fence as the proprietor is liable for, and such payment shall be made with the rent of the land, and shall be deemed in law to be part of such rent.

8. Any tenant or holder of land under a permit of occupation having a right to purchase such land at a fixed price shall, on completion of the purchase, pay to the proprietor, in augmentation and as part of the purchase money, any sum paid by such proprietor for the fencing of such land, and shall become and be liable to repay to the British South Africa Company in its local Treasury such sums as remain unpaid, as the same become due and payable in terms of this Ordinance.

9. Where in the case of any local authority the title to land provides that upon the sale thereof the British South Africa Company shall be entitled to receive a proportion of the purchase price, the local authority shall be entitled to deduct from the purchase price of land sold any debt due or amount paid by it in respect of fences on the land so sold erected under this Ordinance.

10. The provisions of sections 14 and 15 of the "Fencing Ordinance, 1904," in regard to repairs shall, *mutatis mutandis*, apply to fences erected in terms of this Ordinance.

11. Where a fence crosses any road used as of right by the public or by any neighbouring landowner, a properly constructed swing gate shall be placed at the point of crossing.

12. Any person opening such gate, except for the purpose of passing through, or omitting to close such gate after having passed through, and any person damaging such gate and omitting to immediately repair such damage shall be liable to a fine not exceeding £10, or in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

13. The Administrator may, for the purpose of the more effective prevention or control of disease, apply the provisions of this Ordinance in respect of fencing to municipalities and townships and such land adjoining as may be deemed expedient, and to places within a radius of ten miles of an area declared actively infected in terms of section 2 hereof, if, owing to the number of cattle in such places, or other causes, it appears expedient.

14. (1) The owner or proprietor of the land along the boundaries of which fences have already been erected by the British South Africa Company for the purpose of preventing the spread of

African Coast Fever in cattle shall be and is liable to repay to the British South Africa Company in its local Treasury one-half of the cost of so much of the fence as may be along the boundary of such land. The provisions of sections 7 and 8 of this Ordinance shall apply in the case of land held under lease or permit of occupation along the boundaries of which fences have already been erected. The British South Africa Company may remove any such fence already erected which is within and not on or along the boundaries of any land when no longer necessary for the purposes for which it was erected.

- (2) Any payment due in respect of any such fence may be made as provided by section 4 of this Ordinance, and under the like conditions as to security for such payment as are prescribed under section 6.

15. Within any area declared by the Administrator to be actively infected under the provisions of section 2, or to which the provisions of this Ordinance shall have been applied in terms of section 12, the Administrator may for the purpose of more effectively preventing the spread of disease cause to be constructed on any land a dipping tank and any structures incidental thereto or other appliances for the dipping of stock, and may recover the expenditure incurred from the owner of the land on which such tank, structures or appliances have been constructed. The cost of such tank, structures or appliances shall be paid on the same terms and under the same conditions as are applicable to boundary fences under sections 4, 6, 7 and 8 of this Ordinance.

16. In addition to any penalties that may be imposed under the said Ordinance or any amendment thereof, or under any regulations framed thereunder for the unlawful movement of cattle, the Court of the Magistrate before which the case is tried or the High Court in the like instance may direct the confiscation of any cattle unlawfully removed, and such cattle, if infected with disease or likely to convey infection, shall be destroyed without compensation. Should there be no danger of infection the Administrator may order such cattle to be temporarily kept at any spot denoted by him and then sold. The proceeds of any such sale shall be paid to the British South Africa Company in its local Treasury.

17. Section 11, sub-section (1) of the said Ordinance is hereby repealed, and in lieu thereof the following shall be the section :—

“Should any Inspector, Sub-Inspector or any person specially authorised by the Administrator to carry out the provisions of this Ordinance know or suspect that any animal is infected with any destructive disease such Inspector, Sub-Inspector or other authorised person may forthwith place such animal in quarantine, together with such land as is necessary for its isolation, and such animals as have been or are suspected of having been in contact with such animal or with infection. Notice of such quarantine shall be given in writing to the owner or custodian of such animal and to the Magistrate of the district, and shall remain in force for such time as the Chief Inspector or Controller of Stock may direct, unless the Administrator shall sooner, if he thinks fit, issue the notice referred to in sub-section (2) of section 5. A copy of the notice of any such quarantine shall be posted at the office of the Magistrate, and shall be inserted by the Magistrate in some newspaper, if any, circulating in the district.”

18. Section 16 of the said Ordinance is hereby repealed, and in lieu thereof the following shall be the section :—

“Any Government Veterinary Surgeon or any person thereto authorised by the Controller of Stock, Chief Inspector or by a Magistrate may enter any land, building, kraal or enclosure for the purpose of inspecting animals. Should any animal be found to be infected with any destructive disease, or should such infection be reasonably suspected, he may quarantine such animals as in this

Ordinance provided, and may order the proper disinfection of any building, kraal or enclosure in which such animal is or may recently have been, and the furniture and fittings thereof. Should it be impossible to properly disinfect such stable, kraal or enclosure, furniture or fittings in any of them, he may order the destruction thereof; provided that no building, kraal or enclosure shall be destroyed unless the owner consents thereto in writing, or failing such consent, the Administrator orders that such destruction be carried out."

19. Section 22, sub-section (1) of the said Ordinance is hereby amended by the addition of the following words after the word "obtained" in the twelfth line of the said sub-section, "and any person receiving or taking delivery of any animals without having ascertained that such permit has been obtained."

20. This Ordinance may be cited as the "Animals Diseases Amending Ordinance, 1911." and shall be read as one with the "Animals Diseases Consolidation Ordinance, 1904." and the "Animals Diseases Amendment Ordinance, 1910."

No. 188 of 1912.]

[6th June, 1912.]

ANIMALS DISEASES CONSOLIDATION ORDINANCE, 1904.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby amend Government Notice No. 295 of 1908 by the omission of the words "other than glanders, epizootic lymphangitis or African Coast Fever" where they occur in section 5 and in the first paragraph of Schedule "A" thereof.

No. 189 of 1912.]

[6th June, 1912.]

ANIMALS DISEASES CONSOLIDATION ORDINANCE, 1904.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that, notwithstanding the provisions of section 12 of Government Notice No. 50 of 1912, the removal of cattle for purpose of obtaining food or water may be permitted at the discretion of the Chief Inspector, and under such conditions as he may prescribe.

No. 216 of 1912.]

[4th July, 1912.]

REMOVAL OF CATTLE TO PRESCRIBED AREAS.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that, notwithstanding the provisions of Government Notices Nos. 47 and 254 of 1910 and 51 of 1911 the removal of cattle to any point within twenty miles of the border of the territory defined by the Crocodile, Shashi and Ramaquabane Rivers, to the south-east beacon of Mphoeng's extension on the last named, may be allowed until further notice under permit from the Chief Inspector for the purposes of grazing and watering.

No. 50 of 1912.]

[8th February, 1912.]

AFRICAN COAST FEVER.

Regulations regarding the movement of cattle and the prevention and suppression of disease.

1. UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notices Nos. 329 of 1910 and 308 of 1911 and make the following provisions in lieu thereof:—

2. The various districts of Southern Rhodesia are hereby declared an area infected with African Coast Fever for the purposes of section 5 (2) of the aforesaid Ordinance, and, save as hereinafter set out, all movement of cattle within the said districts is prohibited until further notice.

General Movement.

3. For the purpose of section 22 (1) of the said Ordinance, the following shall be regarded as places within the boundaries of which the movement of cattle may be allowed without special permission :—

- (a) Single farm.
- (b) Two or more adjoining farms, farmed together under one management and situated within one cattle transport area.
- (c) An area, the property of one owner, enclosed by a substantial fence.
- (d) For grazing purposes, an area within a radius of four miles of native kraals situated on unalienated land or in reserves, save and in so far as such area includes any private land.

The sites of such kraals shall be deemed to be the places where they are situated at the date of promulgation of these regulations.

4. Notwithstanding the provisions of the last preceding section, or of section 9 hereof, the Chief Inspector may, on the outbreak of disease, or for such other cause as may be deemed expedient, direct the isolation or quarantine of cattle on a limited area of the aforesaid places.

5. The movement of cattle from place to place may be permitted under the special permission, in writing, of an Inspector, Sub-Inspector, or other officer or person duly authorised by the Administrator to grant such permission.

6. No permission as aforesaid shall permit the movement of cattle—

- (a) Without the written consent of the owners, occupiers or managers of occupied land, and in the case of native reserves, of the Native Commissioner of the district over which land or reserve such cattle will pass, whether along roads or otherwise; provided, however, that refusal to grant such consent shall be in writing, and provided further that if the Controller of Stock or the Chief Inspector shall consider that such consent is withheld without good and sufficient cause he may permit of movement without such consent.

If any such person mentioned above refuse to give consent or to state a reason for refusing to do so in writing, no valid objection shall be deemed to exist and movement may be permitted without such written consent.

- (b) Within a veterinary district as defined in the Schedule annexed hereto from one transport area to or through another without the consent of the Cattle Inspector in charge of such area.
- (c) From any veterinary district to or through another without the consent of the District Veterinary Surgeon of such district.

Slaughter Cattle.

7. Cattle moved to any centre for slaughter under the provisions of these or any other regulations shall, on arrival, be immediately taken to such quarantine area (if any) as is provided for the purpose and immediately branded with the letters "V.D." on the near hip.

8. Cattle admitted to a quarantine area in terms of the last preceding section shall be slaughtered within twenty-one days of the date of admission, and shall not be permitted to leave the same except for the purpose of being slaughtered at the appointed abattoir, and if found outside such area, except for the said purpose, may be destroyed on the order of the Chief Inspector or Controller of Stock; provided, however, that the Chief Inspector may allow the removal of cattle from such an area under such conditions as he may prescribe.

Transport Cattle.

9. The use of cattle for draught purposes is prohibited except :—

- (1) Within the boundaries of the places defined in section 3 (a), (b) and (c) hereof.
 - (2) Within the boundaries of areas already fixed for the use of cattle for draught purposes in terms of regulations published under Government Notice No. 329 of 1910, or such other areas as may be fixed by the Administrator.
10. Notwithstanding the provisions of section 9, no permit shall authorise the working of cattle
- (a) which are not clearly and distinctly branded with the registered brand of the owner;
 - (b) in any wagon or vehicle which shall not have the owner's name and address legibly and permanently inscribed on the right side thereof.
11. No wagon or other vehicle drawn by oxen shall be moved from one cattle transport area into another without the permission of the Cattle Inspectors concerned, and under such conditions as they may impose.

General Provisions.

12. On the outbreak or suspected outbreak of disease, the Administrator may declare an area of infection around and embracing the place of outbreak or suspected outbreak, and a further area or areas around such area of infection as a guard area, whereupon all movement of cattle into and from place to place within such area or areas shall be immediately suspended, except as hereinafter provided.

A.—In areas of infection and guard areas:—

- (1) Cattle in transit by rail may be moved through such area.
- (2) Cattle from beyond the borders of Southern Rhodesia may be detained within such area or areas *en route* to destination.
- (3) Cattle for *bona fide* farming, dairy and slaughter purposes may be moved into such area or areas by permission of the Chief Inspector and under such conditions as he may impose.

B.—In guard areas only:—

Cattle may be moved into and from place to place within such area under the conditions of section 6 hereof.

13. The removal of green forage, hay, fodder, bedding reeds, manure or of such other articles as may be reasonably supposed capable of conveying infection, shall be prohibited from areas of infection, save and except with the special permission of the Administrator.

14. Whenever an area shall have been declared under section 12 hereof, every person within such area, or within such further area as may be specified by Government Notice, owning or in charge of cattle shall, upon the death or slaughter because of disease, suspected disease, or accident, of any such cattle, immediately report such occurrence through the nearest Cattle Inspector, Native Commissioner or Police Officer to the District Veterinary Surgeon.

15. Notwithstanding the provisions of these regulations, it shall be competent for the Chief Inspector of Cattle to authorise and direct the movement of cattle for the purposes of isolating, dipping, quarantine, or any other such objects as may be deemed necessary to prevent or suppress an outbreak of disease.

16. Whenever an area shall have been declared an area of infection or guard area in terms of section 12 hereof, any person who shall allow any cattle to stray or be otherwise removed, except as provided for in these regulations, from any one place within such area to another place, or from a place outside of to a place within such area, shall be guilty of an offence against these regulations.

17. All cattle within the limits of the various commonages and townlands, areas of infection and guard areas as declared under section 12 hereof,

or depastured on common grazing ground, shall be dipped or sprayed at least once in every three days, unless the Chief Inspector shall authorise the extension of the time between such dipping or spraying, or the entire suspension of the same.

18. In all areas of infection and guard areas sheep and goats shall be dipped at such periods as may be directed by the Chief Inspector.

19. Whenever the owner, occupier, or manager of a farm shall adopt means of cleansing cattle running thereon, either by spraying, dipping, or by any other method, the Chief Inspector may order any natives or other persons having cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district within which the farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

20. All permits for the removal of cattle issued under the provisions of the said Ordinance or of any regulations framed thereunder shall specify legibly and clearly on the face thereof the place from and to which such cattle may be removed, the route by which they shall travel, the number and brands of such cattle, the time allowed for the journey, and such other particulars and conditions as it may be deemed expedient to provide.

21. No permit issued for the movement of cattle shall be taken to authorise any trespass in connection with such movement.

22. Notwithstanding the provisions of these regulations, it shall not be lawful for any owner of cattle to allow any such cattle to be on any road, public outspan, commonage, or any property other than that of the owner, unless they are free from ticks or unless they have been effectively cleansed by dipping, spraying or other process, within fourteen days of being allowed on such road or other place. Any beast having ten or more ticks on it shall not be considered free from ticks.

23. Any person contravening the provisions of these regulations or the conditions set out in permits issued thereunder, shall, where no higher penalty has been by the said Ordinance or any other law provided, be liable in respect of each offence to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months.

SCHEDULE "A."

VETERINARY DISTRICTS OF SOUTHERN RHODESIA.

(1) *Salisbury.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912:—

32. Battlefields; 33. Hartley and Gatooma; 34. Gadzema Station; 35. Makwiro Station; 36. Norton Siding; 37. Hunyani Tank; 38. 1645½ Peg B. & M. & R. Railways; 39. Salisbury A.; 40. Salisbury B.; 41. Salisbury C.; 42. Salisbury D.; 43. Arcturus; 44. Bromley; 45. Marandellas North; 46. Marandellas South; 48. Headlands Station; 49. Junction Mazoe and Lomagundi Railways; 50. 23-Mile Peg, Lomagundi Railway; 51. Passaford Station; 52. 35-Mile Peg, Lomagundi Railway; 53. Gwibi Tank Halt; 54. Banket, Lomagundi; 55. Eldorado, Lomagundi; 56. Selby Siding; 57. Mazoe; and 58. Kimberley Reefs.

(2) *Bulawayo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912:—

1. Plumtree; 2. Marula Siding; 3. Figtree; 4. Westacre Junction; 5. Bulawayo Area; 6. Heaney Junction; 7. Bembesi Station; 8. Insiza North; 9. Insiza South; 10. Shangani North; 11. Shangani South; 14. Redbank; 15. Nyamandhlovu Station; 16.

Malindi Station; 17. Wankies Area; 18. Matetsi Siding; 19. Matopo Terminus; 20. Sabiwa Siding; 21. Gwanda Station; 22. West Nicholson; 23. Belingwe; 24. Essexvale and Balla Balla Areas; 25. Stanmore Siding Area; 26. Filabusi Area.

(3) *Gwelo*.

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

12. Somabula Siding; 13. Gwelo Station; 24. Selukwe Area; 25. Surprise Area; 26. Indiva Siding; 27. Lalapanzi; 28. Iron Mine Hill Siding; 29. Umvuma Siding; 31. Que Que Station.

(4) *Umtali*.

An area comprising the native districts of Umtali, Melsetter, Makoni and Inyangwa.

No. 175 of 1912.]

[30th May, 1912.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that, notwithstanding the provisions of Government Notices Nos. 47 and 254 of 1910 (and 51 of 1911), the removal of cattle to within that portion of the prescribed areas westward of the Salt River, Tuli district, may be allowed under permit from the Chief Inspector, for the purposes of grazing and watering.

No. 213 of 1912.]

[27th June, 1912.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notices Nos. 59, 70 and 105 of 1912, and, in terms of section 12, declare the following areas of infection and guard areas for the purposes of the said Ordinance :—

1. NATIVE DISTRICTS OF UMZINGWANI, BULAWAYO, MATOBO AND BULI.

(a) *Areas of Infection.*

1. That portion of Alnwick and Sauerdale lying between the Bulawayo-Mafeking railway line on the west, and the fence between the southern beacon of the farm Umganin and the northern boundary of the farm Nil Desperandum on the east.

2. The farms Adams, Emangeni, Nyorka and Ballarat, and that portion of the Essexvale Estate known as the North Paddock, which adjoins the farm Ballarat on its eastern boundary.

3. The fenced sub-division of Bulawayo Commonage which includes the township, suburbs and Hillside.

4. Induba Farm.

5. The farms Collaton, Irene and Maboqutwaneni Outspan.

(b) *Guard Areas.*

An area bounded by and including the following farms :—Lochard Block, Half Ration Rancho, Chilton, Fincham's, Inyati Reserve, Huntsman, Robert Block, Induna, Waterfall, Dingaan, Rouxdale, Fundisi, Helenvale (excluding farms Nos. 1, 3 and 16), Slight's, Billars, Stonycroft, Craiglee, Blewbonny, Ireland, Welcome, Paul's Rest, McGeer's Luck, Centenary Mission, Springvale, Vreigevicht, Outspan No. 3, Anglesea, Mineral King, World's View, Matopo Block, Mission Farm Brethren in Christ, Absent, that portion of the Matopos lying north of a line drawn from the south-

eastern beacon of Absent to the north-western beacon of Longfield. The Range, Clarke's, Swaithe's, Limerick, Pioneer's Rest, Hayhill, Rietfontein, Bradford, Hamilton, Mayfair, York, Indina, Rathline, Westondale. Sub-division A: Fochabers, Kodhwayo, Zimbile and Lochard Outspan.

2. GOROMONZI DISTRICT.

(a) *Area of Infection.*

Salisbury Commonage.

(b) *Guard Areas.*

1. The farms Gillingham, Rainham, Stamford and Hayden.
2. The farms Avondale, Mount Pleasant and Nursery.

3. UNTALI DISTRICT.

(a) *Area of Infection.*

Untali Commonage.

(b) *Guard Area.*

An area bounded by and including the unsurveyed land known as Penhalonga Valley, the farms Dupris, Ferndale, Fairholme, Barrydale, from the north-western beacon of the latter along the eastern boundaries of the Premier Estate, Deepdene West and The Dairy, thence by and including the farms Wiermouth, Raheen, Fern Valley and Fernhill to the Anglo-Portuguese boundary, thence along this boundary in a northerly direction to the first-named place.

4. MELSETTER DISTRICT.

(a) *Area of Infection.*

The farms Tilbury, Dunstan, Sauerombi and Lindley.

(b) *Guard Area.*

An area bounded by the Anglo-Portuguese border on the east, and by and including the following farms on the west:—Weltevreden, Riverange, The Drift's, Cambridge, Zaaiplets, Nyaruma, Nyhodi, Bloemhof and the Ingorime Reserve No. 1.

5. MAKONI AND INYANGA DISTRICTS.

(a) *Areas of Infection.*

The Makoni Reserve and the farms Makoni Kop, Lesapi Drift, Lesapi Valley, Dombo Outspan, Inyangura, Notgotimyet, Timaru, Rodel, Liverpool, York, Inyangonibe and Inyanga Valley.

(b) *Guard Area.*

An area as follows:—By and including the farms Zimati Wedge, Castle Kop, Lion's Head, Outspan, Lesapi Drift, Lesapi Cave, Morkonyora, Chitora Outspan, Chimbi, Notgotimyet, from the northern beacon of the latter in a straight line to the south-west beacon of Rathcline and along its southern boundary, thence in a straight line to Mount Zewa and Bayahura, and southward along the Anglo-Portuguese frontier to the Hondi River, following the southern boundary of the Inyanga native district to the Nyatanda River, thence up the Nyatanda River to the southern boundary of the Makoni Reserve, thence along the southern and western boundaries of the said reserve to the farm The Chase, thence by and including The Chase, Mboobo Vale, Mount Zanga Outspan, Inyamasanga, Manda, Zimati and Zamati Kop.

No. 233 of 1912.]

[11th July, 1912.]

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notice No. 127 of 1910, in so far as it relates to the Protectorate of Nyasaland, and further do hereby prohibit the introduction into Southern Rhodesia of cattle from Nyasaland until further notice.

No. 252 of 1912.]

[1st August, 1912.

AFRICAN COAST FEVER. TRANSPORT AREAS.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 9 of the regulations published under Government Notice No. 50 of 1912, declare the areas described in the subjoined Schedule as areas within which the use of cattle for draught purposes may be permitted.

SCHEDULE.

62. *Mazi Siding.*

An area including the farms Cheronga, Highfield, Kirbyvale, Mona, Dyffryn, Maidstone, Harrisonville, Recondite and Crofton.

63. *Inyazura Siding.*

An area bounded by and including the following farms :—Inyamapamberi Outspan, Tiny, Marngu, Mount Zonga Commonage, Mount Zonga, Kwapassi Outspan, Orowati, Tableview, Tsungwesi Source, Tsungwesi Ridge, Everton, and the unsurveyed land lying east of a line drawn from the north-west beacon of Everton to the south-west beacon of Tiny.

64. *Igusi Siding.*

An area bounded by and including the following :—Winter, Spring, Eland, Buda Block No. 2, Grant, Batley, Groote Schuur No. 2, Frankland, Fry's Farm, Goshen Flat, Uhlanulu, Ubusiga, Ughwindhla, Ihlobo, Woodlands, Teakdale, Barn Park, Forest Hill, Groote Schuur, Majindan, Mvuba, Barwon, Campaspe, Esperanza, Merryland and Maraposa.

65. *Gwaai Area.*

An area bounded by the Malinda area, the Bechuanaland border, the Plumtree, Nyamandhlovu, Igusi Siding, Bembesi, Shangani North and Gwelo areas, from the most northerly point of the latter down the Shangani River to the western boundary of the Shangani Reserve, thence in a southerly direction along the same to the Gwampa River and down this river to the Malinda area.

No. 295 of 1912.]

[15th September, 1912.

ESTABLISHMENT OF POUND ON FARM "ANNANDALE."

UNDER and by virtue of the powers vested in me by section 5 of the "Pounds and Trespasses Ordinance, 1903," I do hereby declare and make known that, at the request of the Civil Commissioner, Bulawayo, a Pound has been established on the farm "Annandale," at Filabusi, in the district of Bulawayo, and that the said Pound shall be available for the public from the 16th day of September, 1912.

No. 203 of 1911.]

[15th June, 1911.

GAME LAW CONSOLIDATION ORDINANCE, 1906.

UNDER and by virtue of the powers conferred upon me by the "Game Law Consolidation Ordinance, 1906," I do hereby extend the provisions of Government Notice No. 40 of 1909, as amended by Government Notices Nos. 128 and 129 of 1909, for a further period of one year from the 30th June, 1911.

SUMMARY OF THE "GAME LAW CONSOLIDATION ORDINANCE, 1906," AND REGULATIONS ISSUED THEREUNDER.

The Ordinance divides the game into three distinct classes, described as follows :—

- (a) Birds and Small Buck.
- (b) Bushbuck, Hartebeest, Impala, Lechwe, Pookoo, Roan and Sable Antelope, Sitatunga, Tsessebe, Waterbuck, and Wildebeest.
- (c) Royal Game, which includes Eland, Elephant, Giraffe, Gemsbok, Hippopotamus, Inyala, Koodoo, Ostrich, Rhinoceros, Springbuck and Zebra.

The shooting season for Class "A" is as follows :—

In Mashonaland :

Birds from 1st May to 30th September.

Small Buck from 1st May to 31st October.

In Matabeleland :

Birds and Small Buck from 1st May to 31st October.

To shoot in Class "A" a licence costing £1 per annum is required. This entitles holders to hunt in both Provinces during the open season.

Class "B."—The season opens on 1st July and closes on 30th November in both Provinces. The licence fee is £25 for non-residents and £5 for persons having their domicile in Southern Rhodesia. This licence entitles the holder to shoot up to 15 head, which number may be increased to a total of 25 upon payment of a further sum of £15 in the one case and £5 in the other.

Class "C."—The Administrator may, if he is satisfied that the animals are actually required for scientific purposes, grant to the holder of a game licence permission to shoot or capture any of the species included in this Class. Such permit requires a £5 stamp. Applications in writing, together with proof of *bona-fides*, should be addressed to the Director of Agriculture.

Game for Farming Purposes.—Permits are granted for the capture of Eland, Ostrich, Zebra or other animals for the purposes of breeding or farming. Such permits require a stamp of the value of £1 and remain in force for six months. Application, accompanied by a sworn declaration, should be made through the Director of Agriculture or the Civil Commissioner of the district.

Game Injuring Crops.—The occupier of any cultivated land or any person acting under the authority of such occupier, may at any time destroy game actually doing damage on such land.

Elephants on Occupied Farms, Melsetter.—The destruction of Elephants when found on occupied farms on the High Veld in Melsetter District is authorised (*vide* Government Notice No. 284 of 1908).

Tsetse Fly, Hartley District.—Government Notice No. 201 of 1912 withdraws the Close Season for Class "B" in a certain area in the Hartley District until 30th June, 1913, and transfers from Class "C" to Class "B" Eland, Koodoo, and Zebra so far as that area is concerned. Under Government Notice No. 129 of 1909 game in Class "B" may be shot without a licence in this area.

Game in Class "A" may be hunted in the close season until further notice on private land in the Melsetter district by holders of a licence.

Protected Areas.—No game may be hunted or killed within the limits of the Commonage or Townlands of Bulawayo and within a radius of two miles of the Court House, Gwelo, or within the Urungwe Game Sanctuary, as defined by Government Notice No. 237 of 1906.

"Locust Birds" are strictly protected, *vide* Government Notice No. 121 of 1907.

Export of Game.—No living Game or the Eggs of any Game Birds may be exported beyond the limits of Southern Rhodesia without a written permit.

Shooting on Private Land.—A licence does not entitle the holder thereof to shoot on private land without the permission of the land-owner.

No. 353 of 1911.]

[16th November, 1911.]

GAME LAW CONSOLIDATION ORDINANCE, 1906.

UNDER and by virtue of the powers vested in me by the "Game Law Consolidation Ordinance, 1906," I do hereby suspend the operations of sections 9, 10 and 12 of the said Ordinance until the 30th November, 1912, in regard to game in Class "B," and the following game in Class "C," viz. :—Eland, Koodoo, Zebra and Burchell's Zebra or Quagga, within the following area :—

DESCRIPTION OF AREA.

An area bounded by a line drawn from the junction of the Merowa and Umfuli Rivers, up the Umfuli to its junction with the Susenje, thence up the Susenje and Massome Rivers to the headwaters of the latter; thence to the drift where the Sinoia-Urungwe road crosses the Inyonga River; thence northerly along this road to the Chidzurgwe Hill; and thence direct to the junction of the Merowa and Umfuli Rivers.

No. 201 of 1912.]

[20th June, 1912.]

GAME LAW CONSOLIDATION ORDINANCE, 1906.

UNDER and by virtue of the powers conferred upon me by the "Game Law Consolidation Ordinance, 1906," I do hereby extend the provisions of Government Notice No. 40 of 1909, as amended by Government Notices Nos. 128 and 129 of 1909 and 203 of 1911, for a further period of one year from the 30th June, 1912.

No. 243 of 1912.]

[18th July, 1912.]

GAME LAW CONSOLIDATION ORDINANCE, 1906.

UNDER and by virtue of the powers vested in me by section 4 (2) of the "Game Law Consolidation Ordinance, 1906," I do hereby suspend the operation of the said Ordinance, in so far as it relates to the destruction of hippopotami, on the farms Impofhoe and Hippovale, in the district of Hartley, and in such portions of the rivers Serui and Umfuli as are contiguous to the said farms, for a period of one year from the 19th July, 1912.

No. 296 of 1912.]

[5th September, 1912.]

GAME LAW CONSOLIDATION ORDINANCE, 1906.

UNDER and by virtue of the powers vested in me by the "Game Law Consolidation Ordinance, 1906," I do hereby cancel Government Notice No. 54 of 1910, which suspended the operation of the said Ordinance as to a portion of the Marandellas district, within an area extending one mile outwards from the African Coast Fever Cordon Fence, in respect of sable antelope, tsessebe, eland and koodoo.

No. 297 of 1912.]

[5th September, 1912.]

GAME LAW CONSOLIDATION ORDINANCE, 1906.

UNDER and by virtue of the powers vested in me by section 4 (2) of the "Game Law Consolidation Ordinance, 1906," I do hereby suspend the operation of the said Ordinance in so far as it relates to the killing, hunting or capture of game in Class "A" in the native district of Chibi, for a period of six months from the date hereof.

No. 110 of 1908.]

[16th April, 1908.]

IMPORTATION OF CATTLE.

UNDER and by virtue of the powers conferred on me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and repeal so much of the Regulations published under Government Notice No. 187,

dated the 26th of July, 1906, as relate to the importation of cattle from the Colony of the Cape of Good Hope and the United Kingdom of Great Britain and Ireland, and make the following provisions in lieu thereof:—

1. The importation of cattle may be permitted from the Colony of the Cape of Good Hope and the Orange River Colony on the following terms and conditions—

- (1) A permit shall be required from the Chief Inspector which may contain such conditions as shall from time to time appear expedient.
- (2) Applications for permission to import shall be in the Form "A" attached hereto, and accompanied by a declaration in the annexed Form "B."
- (3) The importation of cattle with more than two permanent central incisor teeth shall not be permitted.
- (4) All importations shall be by rail and for the purposes thereof Bulawayo shall be regarded as the port of entry.
- (5) All cattle imported in terms of these Regulations shall on arrival at Bulawayo, Salisbury, or Umtali be removed to a place of quarantine under the supervision of an Inspector of Cattle, there to be submitted to such examination and tests as the Chief Inspector may direct. If such examination or tests disclose the existence of any destructive disease the cattle shall be immediately destroyed and the carcases thereof disposed of in such manner as a Government Veterinary Surgeon may authorise or require. The Chief Inspector may permit of any examination or tests as aforesaid being dispensed with in the case of cattle in transit by rail for any place beyond the boundaries of Southern Rhodesia.
- (6) All expenses or losses incident to quarantine, examination, testing or destruction as aforesaid shall be borne by the owner of the cattle.

2. The importation of cattle from the United Kingdom of Great Britain and Ireland may be permitted under the following terms and conditions—

- (1) Importation shall be through and direct from the coast ports of the Cape Colony, and there shall be a consignment note or other satisfactory evidence that cattle so imported have come direct from Great Britain or Ireland.
- (2) The provisions of sub-sections (5) and (6) of section 1 hereof shall apply to importations in terms of this section.

3. No person shall import cattle in terms of these Regulations except for his own use, provided however that permission may be granted to import for others on the applicant disclosing the name of the person or persons for whom he proposes to act.

4. Any person introducing cattle in contravention of these Regulations, or failing to comply with any conditions attached to permits to import, or furnishing applications, declarations, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, testing, destruction or disposal of carcases, shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months, unless higher or greater penalties shall have been provided for such offences by the "Animals Diseases Consolidation Ordinance, 1904," provided however that the penalties imposed by these Regulations shall not exempt any cattle from destruction in terms of the aforesaid Ordinance.

ANNEXURE "A."

APPLICATION FOR CATTLE IMPORTATION PERMIT.

1. Applicant's Name and Address.....
2. Number and Class of Cattle to be imported.....
3. Area or Farm and District where Cattle are at present located.....
4. Area or Farm and District to which Cattle are to be moved.....

Applicant's Signature.....

Date.....

Application.....

Permit No.....

ANNEXURE "B."

I,
 residing on the farm
 in do solemnly and sincerely
 declare that the (number in
 writing) animals also enumerated below have been in my possession since
 birth, and that lung sickness, pleuro-pneumonia or other contagious or
 infectious disease has not existed amongst any of my cattle, nor on my
 farm, nor among any cattle with which these animals have been in contact
 within the last four years, and that these animals have never been exposed
 for sale in any public market or stock fair, nor been in contact with strange
 cattle, and that to the best of my knowledge and belief such cattle in
 travelling to.....Station (*i.e.*, station where cattle
 are to be trucked) will not come into contact with any animals amongst
 which lung sickness or any other contagious or infectious disease has existed
 during that period.

Number of Animals Bulls Heifers

Breed

Seller's Name and Address

Purchaser's Name

Place in Southern Rhodesia to which animals are being sent

And I make this solemn declaration conscientiously believing the same to
 be true.

Declared to at on this
 day of before me.

Resident Magistrate for the district of

No. 211 of 1910.]

[4th August, 1910.

IMPORTATION OF CATTLE FROM NORTH-WESTERN
RHODESIA.

UNDER and by virtue of the powers vested in me by the "Animals.
 Diseases Consolidation Ordinance, 1904," I do hereby declare and make
 known that, notwithstanding the prohibition contained in Government
 Notice No. 89 of 1908, the importation of cattle from North-Western
 Rhodesia may be permitted under the following terms and conditions :—

1. The permission of the Chief Inspector of Cattle shall be first had and obtained.

2. All cattle shall be introduced (a) by rail via the Victoria Falls, or (b) by way of the town or port of Feira, which are hereby declared to be ports of entry.

3. All applications for permission to import shall be accompanied by a certificate by a Government Veterinary Surgeon of North-Western Rhodesia that—

(a) the districts from which they come and through which they pass are free from contagious diseases of animals;

(b) the animals in respect of which the application is being made have been examined and are free from contagious diseases of animals.

4. All cattle shall on entry be taken, where possible by rail, to such quarantine area and shall remain in quarantine for such period as the Chief Inspector of Cattle shall direct, but not less than three months.

5. Any person found introducing cattle in contravention of these regulations, or failing to comply with any of the conditions attached to permits to import, or furnishing applications, certificates, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, etc., shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months; provided, however, that the penalties imposed by these regulations shall not exempt from liability to penalties, forfeiture, or destruction, elsewhere provided for.

ANNEXURE "A."

Certificates under Section 3.

(a) I hereby certify that I have examined the following cattle belonging to Mr.

.....cows and heifers,

.....calves,

.....oxen and bulls,

and that the districts from which they come and through which they will pass in this Territory *en route* to Southern Rhodesia are to the best of my knowledge free from all destructive diseases of cattle.

Signed.....

Government Veterinary Surgeon.

(b) I hereby certify that I have examined the following animals belonging to Mr.

.....cows and heifers,

.....calves,

.....oxen and bulls.

In my opinion these animals are free from all destructive diseases.

Signed.....

Government Veterinary Surgeon.

NOTE.—All numbers are to be expressed in words.

IMPORTATION OF CATTLE FROM GREAT BRITAIN.

OWING to an outbreak of Foot and Mouth Disease no permits for importation of cattle from Great Britain into Southern Rhodesia will be granted until further notice.

No. 254 of 1910.]

[22nd September, 1910.

SOUTHERN BOUNDARY.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby provide as follows :—

1. All cattle within an area of twenty miles from Shashi and Ramaquabane Rivers in the native districts of Tuli-Mauzamnyama and Bulalima-Mangwe, save and except westwards of the south-eastern boundary of the Mphoeng's reserve, shall, within one month from date hereof, be removed therefrom by the owners to such place or places as shall have been approved by the Native Commissioners of the said native districts respectively.

2. The introduction of all cattle into the aforesaid area is prohibited.

3. Any person refusing or neglecting to remove cattle from the area as herein provided or introducing cattle into such area shall be liable to the penalties provided by the aforesaid Ordinance, and all cattle found in the said area in contravention of this Notice shall forthwith be destroyed.

No. 391 of 1908.]

[17th December, 1908.

BRANDS ORDINANCE AMENDMENT ORDINANCE, 1908.

UNDER and by virtue of the powers vested in me by the "Brands Ordinance, 1900," as amended by the "Brands Ordinance Amendment Ordinance, 1908," I do hereby cancel and withdraw the Regulations published under Government Notice No. 204 of 1900, and declare the following shall be in force in lieu thereof, from and after the 7th January, 1909 :—

1. The Registrar of Brands shall have his office in the Agricultural Department. With the exception of the Magistrate of Salisbury, the Magistrate in each district of Southern Rhodesia, and the Assistant Magistrate in each sub-district, shall be a deputy Registrar of Brands for the magisterial district or sub-district to which he is appointed. The offices of the Deputy Registrars of Brands shall be the offices of the several Magistrates.

2. (a) The form of application for registration of a brand shall be that marked "A" in the Schedule attached to this Notice.

(b) The form of a certificate of registration shall be that marked "B" in the said Schedule.

(c) The form of a transfer of a brand from one registered proprietor to another shall be that marked "C" in the said Schedule.

(d) The form of a certificate of such transfer shall be that marked "D" in the said Schedule.

3. Each Deputy Registrar of Brands shall keep a register, in the form of Schedule "E" hereto, of all brands allotted within his district under the provisions of the Ordinance.

4. Save as hereinafter provided, every registered brand shall consist of two letters and a numeral of plain and uniform pattern; and the first of the letters shall indicate the magisterial district or sub-district in which the holding is situate on which the brand is to be used, and shall be placed above the numeral and letter comprising the brand, so as to be in triangular form.

5. One brand and no more shall be allotted to any person in one magisterial district or sub-district.

6. The size of the characters branded on stock shall not be more than three inches in height nor more than two inches in width.

7. An applicant for a brand shall be allotted the next vacant brand assigned to the district in which he is located, as set forth in Schedule "F" hereof.

8. Each Deputy Registrar shall keep a list of brands assigned to his district, for the inspection of applicants for brands.

9. There shall be payable to the Registrar or Deputy Registrar—

- (a) For every separate registration of a brand, 5s.
- (b) For every transfer of a brand, 5s.

10. All brands shall be imprinted on stock as follows :—

- (a) In the case of horses, mules or donkeys, the first brand shall be imprinted either on the near side of the neck or near rump, and any second or subsequent brand shall (where there is sufficient space for such purpose) be imprinted on the same part of such animal, and at a distance of not less than one and a half inches from and directly underneath last imprint, according to the table herein set forth.

Where there is not sufficient space for the purpose, then such second or subsequent brand shall be imprinted on the part of such animal next in order, according to the following table :—

- i. Off Neck or Rump (or Thigh) :
- ii. Near Shoulder (or Top of Arm) :
- iii. Off Shoulder (or Top of Arm).

- (b) In the case of cattle, the first brand shall be imprinted on the near rump or thigh of the animal, and every second or subsequent brand shall be imprinted at a distance of not less than one and a half inches from and directly underneath the brand last imprinted, according to the following table :—

- i. Off Rump (or Thigh) :
- ii. Near Shoulder (or Top of Arm) :
- iii. Off Shoulder (or Top of Arm).

- (c) In the case of sheep and goats, the first brand shall be imprinted on the near shoulder, and all second or subsequent brands in the following order :—

- i. On Near Side or Ribs :
- ii. Near Rump (or Thigh) :
- iii. Off Shoulder :
- iv. Off Side or Ribs :
- v. Off Rump (or Thigh).

- (d) In the case of ostriches :—

- i. On Near Thigh :
- ii. On Off Thigh.

11. Each proprietor of a registered brand shall have the right, in addition to imprinting his brand in the manner above prescribed, to place such brand on the ears of such animals by punching, tattooing or ear-rivets.

12. The owner of any brand may surrender the same, and the Registrar shall, on receipt of notice thereof, cancel the registration by notice in the *Gazette*.

13. When it appears to the Registrar, upon the report of a Deputy Registrar, Native Commissioner, or Cattle Inspector, that a registered brand is not in use, he may cause notice thereof to be given to the owner thereof, calling upon him to shew cause why the same should not be cancelled ; if cause is not shewn to the satisfaction of the Registrar within six months after such notice, he may cancel the brand.

14. No brand which has been surrendered or cancelled shall be re-allotted until a period of five years from such surrender or cancellation has elapsed.

15. The Registrar shall, at the end of each quarter in every year, or as soon thereafter as possible, transmit for publication in the *Gazette* a statement, in the form of Schedule "E" hereto, of all brands registered under the Ordinance up to the last day of such quarter.

16. The Registrar shall allot a brand to every public pound already or hereafter to be established, and shall register the same.

The first character of every such brand shall be a diamond, and the second the dominant letter of the magisterial district or sub-district, and the third a numeral, the dominant letter to be placed above the diamond and numeral, so as to form a triangle; and the Poundmaster shall, on sale of any stock impounded therein, brand the same with such brand on the portions and in the order prescribed in these Regulations, to shew that the said brand is the last brand at that time imprinted on such stock; and any Poundmaster who shall fail to comply with the provisions of this section shall on conviction be liable to a fine not exceeding £5.

No. 45 of 1909.]

[13th March, 1909.

RABIES.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw the Regulations promulgated by Government Notices Nos. 42, 156 and 228 of 1907, except as to acts done or penalties incurred at the date of the coming into force of this Notice, and except as to officers appointed under Government Notice No. 286 of 1906, whose appointments shall remain valid for the purposes of this Notice, and declare the following Regulations shall have full force and effect in lieu thereof:—

1. All and several the various native districts of Southern Rhodesia are hereby declared to be areas infected with the disease of rabies.

2. Subject to any penalty a dog owner may have incurred under Government Notice No. 285 of 1906 by not registering his dog before the first day of February, 1907, the owner of any unregistered dog liable to registration may register the same at any time after the said date.

3. On and after the date of this Notice becoming operative the owner of every dog arriving at the age of three months, and the owner of every dog imported into Southern Rhodesia after that date, shall register such dog with an official appointed for that purpose, provided that this provision shall not apply to any municipality, township or similar area in which provision for registration exists and is duly enforced.

4. A registration badge shall be issued for each and every dog registered, and the said badge shall be attached to a proper and sufficient collar to be supplied by the owner, which must be placed and kept on each dog registered.

5. A fee to cover the cost of registration and supply of badge in the amount of sixpence will become demandable and payable on registration of each dog.

6. Any dog found at large after the date of this Notice becoming operative, not having and bearing a registration badge duly issued by an official or the local authority, may be summarily destroyed by any person.

7. Any Magistrate, Police Officer, Native Commissioner, Government Veterinary Surgeon, or other official vested with the performance of functions under the "Animals Diseases Consolidation Ordinance, 1904," may, on it appearing to him that any dog or other animal is shewing symptoms which justify investigation as to whether such dog or animal is suffering from rabies or not, order the proper detention, isolation and control of such dog or animal, either in the hands of the owner or at some other suitable place.

8. Should any dog shew symptoms which lead to the suspicion that such dog may be suffering from rabies, the owner thereof shall forthwith notify the fact to the nearest official vested with powers under these Regulations, who shall immediately report the same to the Chief Veterinary Surgeon, and shall either destroy the said dog or isolate and secure it for further observations.

9. On its appearing that any animal is actually suffering from rabies, any of the abovementioned officials may order the destruction of such animal, or may himself destroy it, and may further take control of or destroy, if deemed necessary, any animal which has been in contact with a rabid animal or an animal suspected of being rabid.

10. The carcases of all animals destroyed on account of their being infected with rabies shall be thoroughly burnt by the person or official destroying them, save that such parts as may be required for scientific investigation may be retained under proper precautions. In any case in which a human being has been bitten by a rabid animal, the head of such animal shall, if possible, be taken and sent to the nearest veterinary official.

11. (1) In the event of an outbreak of rabies occurring, the Administrator may by notice in the *Gazette* direct that all dogs within a radius of fifteen miles of such outbreak, or such other area as may be fixed, shall be kept in a safe enclosure or chained up for a period of not less than six weeks from such notification, or such other period as may be fixed, but may be taken out for exercise if kept on a chain or leash by the person exercising them.

(2) In the event of a suspected outbreak of rabies occurring, the Magistrate of a district may, and at the request of the Chief Inspector of Stock shall, direct that all dogs within a radius of fifteen miles, or such other area as may be deemed necessary, shall be kept in a safe enclosure or chained up for a period not exceeding four weeks, but may be taken out for exercise if kept on a leash or chain by the person exercising them.

(3) No dog shall be removed from any proclaimed area during such periods of quarantine.

12. Any dog found at large in a notified area at any time during the prescribed period may be summarily destroyed by any person, and the owner or person responsible for the custody of such dog shall be liable to the penalty hereinafter laid down.

13. Any person contravening any of the above Regulations, or failing to carry out any of the provisions thereof, shall be liable, on conviction, to a fine not exceeding £10 for each offence; or, in default of payment, to imprisonment, with or without hard labour, for a period not exceeding one month.

No. 336 of 1911.]

[26th October, 1911.]

RABIES.

THE following instructions regarding the treatment of persons bitten by rabid animals are published for general information.

In every case where a person has been bitten by a dog or other animal known or suspected to be rabid, the following precautions are recommended :—

- (1) The wound should be immediately and thoroughly cauterised. This, if it does not altogether prevent the disease, delays its onset sufficiently for Pasteur treatment to be successfully applied.
- (2) The patient should be sent to Salisbury for treatment at once. Delays are dangerous.

- (3) The fullest information should be sent to the Health Department as to date when bitten, locality, fate of dog, and especially reasons for supposing the dog to be mad.

No. 220 of 1912.]

[4th July, 1912.

RABIES.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare the provisions of clause 11 of Government Notice No. 45 of 1909 to be in force in the native districts of Victoria and Ndanga for a period of three months from the 20th July, 1912.

No. 249 of 1912.]

[25th July, 1912.

RABIES.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 212 of 1912, and declare the provisions of clause 11 of Government Notice No. 45 of 1909 to be in force in the magisterial district of Gwelo for a period of three months from date hereof.

No. 250 of 1912.]

[25th July, 1912.

RABIES.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare the provisions of clause 11 of Government Notice No. 45 of 1909 to be in force in the native districts of Chibi, Chilimanzi and Gutu for a period of three months from date of publication hereof.

[1st July, 1912.

RABIES.

SEVERAL cases have recently occurred where dogs having bitten a person or persons, were immediately destroyed and report made that they were possibly infected with rabies. In such cases it is impossible for the Veterinary Department to say in less than 18 to 20 days whether the animals were infected or not, and then only when the head of the dog concerned is received at the laboratory in a good state of preservation. Thus valuable time is lost in the treatment of persons bitten, which may lead to fatal results.

In all cases the suspected animal should, if possible, be secured by a strong collar and chain and the circumstances reported by telegram to "Veteran," Salisbury, when full instructions will be given as to the treatment and observation of the suspected animal.

No. 307 of 1912.]

[19th September, 1912.

RABIES.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare the provisions of sections 1 and 3 of Government Notice No. 260 of 1912 to be in force in the native district of Charter for a period of three months from date of publication hereof.

No. 240 of 1910.]

[1st September, 1910.]

INSECT PESTS.

UNDER and by virtue of the powers vested in me by the "Nurseries Ordinance, 1909," I hereby proclaim the undermentioned insects to be pests within the meaning of the said Ordinance:—

The Red Scale (*Chrysomphalus aurantii*).
 The Oleander Scale (*C. hederæ*).
 The Circular Purple Scale (*C. aonidum*).
 Ross's Black Scale (*C. rossi*).
 The Purple or Mussel Scale (*Lepidosaphes beekii*).
 The Long Scale (*L. gloverii*).
 The White Peach Scale (*Aulacaspis pentagona*).
 Woolly Aphis or American Blight (*Schizoneura lanigera*).

No. 309 of 1909.]

[30th December, 1909.]

IMPORTATION OF PLANTS, ETC., REGULATIONS.

UNDER and by virtue of the powers vested in me by the "Importation of Plants Regulation Ordinance, 1904," I do hereby declare and make known that the following regulations shall be of force and effect on and after 1st day of March, 1910:—

(1) No person shall introduce into Southern Rhodesia from outside South Africa any consignment of potatoes unless accompanied by a certificate from the consignor stating fully in what country and district of that country the potatoes were grown, and that the disease known as Warty disease or black scab, caused by the fungus *Chrysophlyctis endobiotica* Schil is not known to occur on the land on which the potatoes were grown. Any consignment not accompanied by such certificates will be liable to be seized and destroyed.

(2) All consignments of potatoes which are imported from other parts of South Africa or from oversea, if found on inspection to be infested with any pest or disease, other than black scab, will be sorted at the expense of the consignee and the diseased tubers destroyed.

(3) A charge of 6d. per bag or case will be made for sorting.

(4) Should any consignment on arrival be found to be infested with black scab, it will not be sorted but will be totally destroyed.

(5) Any person guilty of a contravention of these Regulations shall be liable to a fine not exceeding £10.

No. 228 of 1912.]

[11th July, 1912.]

IMPORTATION OF PLANTS REGULATION ORDINANCE, 1904.

UNDER and by virtue of the powers vested in me by the "Importation of Plants Regulation Ordinance, 1904," I do hereby declare and make known that Government Notices No. 306 of 1911 and No. 35 of 1912 are hereby repealed, and section 17 of the Regulations published under Government Notice No. 141 of 1906 is hereby repealed and the following regulation substituted in lieu thereof:—

"17. The introduction into Southern Rhodesia of any plant, not being seed, fruit, bulb, tuber, cut flower, vegetable or vegetable transplant originating in the Union of South Africa, not grown in a nursery registered at the Department of Agriculture, Pretoria, under the 'Agricultural Pests Act, 1911,' is prohibited, except under special permission from the Director of Agriculture, Salisbury, Southern Rhodesia, who may impose such conditions in regard to such importation as he may think fit."

No. 282 of 1912.]

[22nd August, 1912.

IMPORTATION OF PLANTS REGULATION ORDINANCE, 1904.

IT is hereby notified for public information that His Honour the Administrator has been pleased to appoint Richard Lowe Thompson, Esquire, to be an Inspector for the purpose of carrying out the provisions of the "Importation of Plants Regulation Ordinance, 1904," and of the "Nurseries Ordinance, 1909."

No. 249 of 1908.]

[27th August, 1908.

PROTECTION OF TREES.

IT is hereby notified for public information that any person who shall cut down for use as fuel, or for any other purposes than *bona-fide* farming, mining or manufacturing purposes, or cause to be so cut down the "Wild Westeria" (native name M'Pakwa or M'poea) tree, will be liable to prosecution for contravention of the provisions of the Forest and Herbage Preservation Act, 1859, and upon conviction to a fine not exceeding £100, or to imprisonment with or without hard labour for a term not exceeding six months, or to such fine and imprisonment, or to such imprisonment without a fine.

VIRUS, ETC., SUPPLIED BY THE VETERINARY DEPARTMENT.

IT is notified for public information that redwater and gallsickness (*anaplasmosis*) virus may be obtained from the Veterinary Department, Salisbury, at a charge of ten shillings per dose.

Solutions of trypan blue and the injection used in the treatment of *trypanosomiasis* (fly disease) of cattle may also be obtained at a charge of five shillings per dose, and blue tongue virus at one shilling and sixpence per dozen doses.

No material will be issued unless a remittance accompanies the order.

Department of Posts and Telegraphs,

Southern Rhodesia.

Postal Notice No. 24 of 1909.

AGRICULTURAL PARCELS POST.

IT is hereby notified for public information that, on and after the 1st August, 1909, any article produced, and, if manufactured, produced and manufactured within Southern Rhodesia may be transmitted by Agricultural Parcels Post at the reduced rate of sixpence for the first lb., and threepence for each subsequent lb. or fraction thereof, up to a limit of eleven lbs. in weight.

The Agricultural Parcels Post is designed to bring the producer into direct communication with the consumer, and is available for the transmission of :—

Biscuits	Dried Meats	Plants
Bread	Eggs	Poultry
Butter	Flour	Seeds
Confectionery	Flowers	Sugar
Cigarettes	Honey	Tobacco
Dried & Bottled Fruits	Jam	Wool Samples

and other articles produced within Southern Rhodesia. It does not extend beyond the borders of Southern Rhodesia.

The senders of articles at the reduced tariff applicable to the Agricultural Parcels Post will be required to sign a declaration that the contents are the *bona fide* produce of Southern Rhodesia.

The limits of size and weight, and the general regulations, are those applicable to the Inland Parcels Post.

This scheme must be regarded as purely experimental, and the Government reserves the right to modify these special rates of postage should too great a financial loss result.

G. H. EYRE,
Postmaster General.

General Post Office, Salisbury,
20th July, 1909.

Postal Notice No. 32 of 1912.

RURAL TELEPHONES.

IT is hereby notified for public information that the Government proposes to materially extend telephonic communication in rural districts throughout Southern Rhodesia so soon as the necessary material can be obtained, and is prepared to consider applications from groups of farmers and others who desire such communication.

Under the proposed scheme telephone lines will be erected from the nearest convenient telephone exchange or telegraph office to a centrally situated farm or place of business, and provided the parties interested undertake to attend to the telephone and transmit telegrams for the public at the tariff in force no rental will be charged for such lines. Suitable accommodation for securing the secrecy of telegrams and telephone conversations must be provided free of charge to the satisfaction of the Postmaster General. The person selected to take charge of a central telephone office for the use of the public, will be required to pay over to the Postmaster General's Department monthly the revenue collected for telegrams and telephonic conversations and to render such simple accounts as may be required in connection therewith.

Branch lines from the selected centres to individual farms, business premises, etc., will be charged at the rental tariff in force, £5 6s. per mile per annum for farms and private residences, and £10 10s. per mile per annum for business premises. These charges are regarded to be as low as is at present feasible. Applications should be made through the Postmaster General.

G. H. EYRE,
Postmaster General.

General Post Office,
Salisbury, 16th July, 1912.

RATES FOR RHODESIA GROWN TOBACCO
(UNMANUFACTURED).

THE Beira and Mashonaland and Rhodesia Railways announce that with effect from 1st November, 1912, Rhodesia grown tobacco (unmanufactured) consigned at owner's risk will be conveyed between all stations, Beira to Broken Hill and Vryburg, including branches, at third class rate, subject to a maximum charge of £2 1s. 8d. per ton, or 4d. per lb., minimum charge as for 50 lbs.; no lower charge than 1s. per consignment. Tariff Book No. 5, clause 63, page 83, is modified accordingly.

THE BEIRA & MASHONALAND & RHODESIA RAILWAYS.

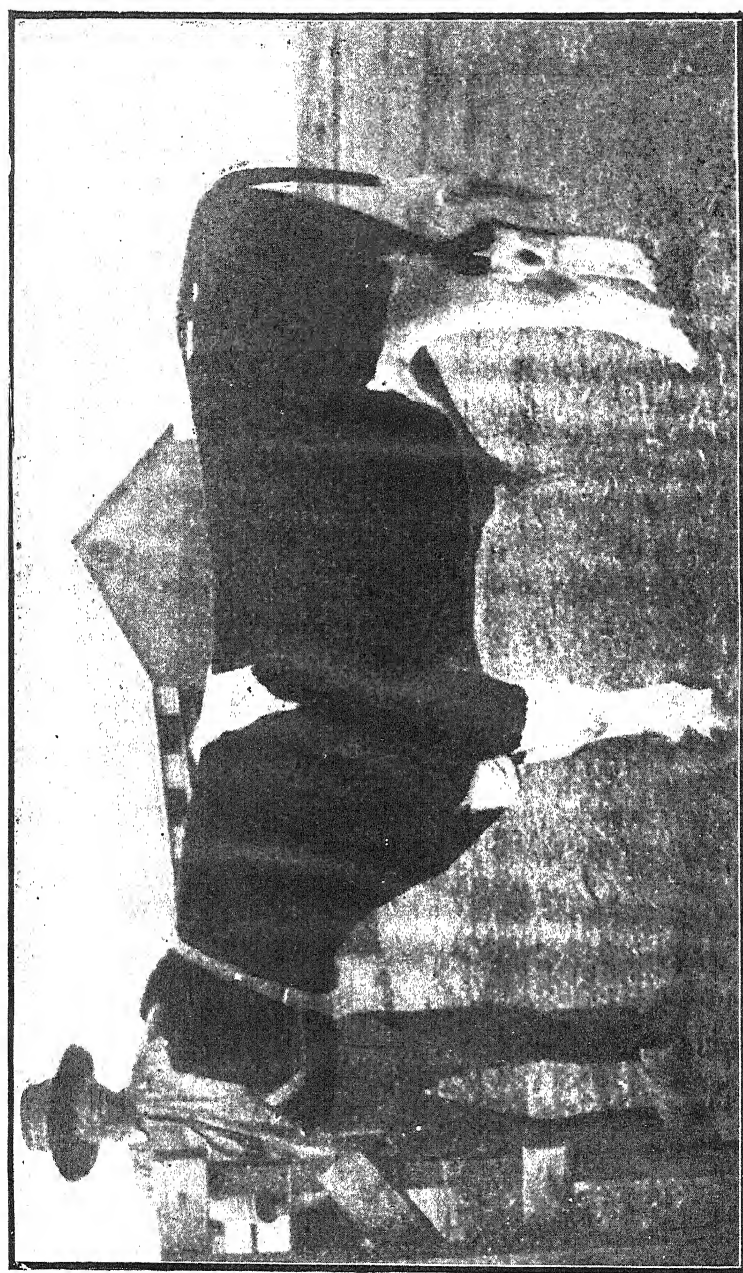
Rates for Cattle and Sheep Dip

A REVISED scale of rates for sheep and cattle dip and dip powder conveyed at owners' risk, to and from all stations between Beira, Broken Hill and Vryburg, inclusive of branches, with effect from 1st October, 1912, is given below.

The scale is applied separately over the Blinkwater, Lomagundi and Mazoe Branches in bookings to or from these lines.

Minimum charge as for 50 lbs., no less charge than 1s. per consignment. Rates in pence per 100 lbs., exclusive of cartage at cartage stations.

Miles.	Per 100 lbs.	Miles.	Per 100 lbs.
1—30	3d.	338—350	29d.
31—40	4d.	351—362	30d.
41—50	5d.	363—375	31d.
51—60	6d.	376—387	32d.
61—70	7d.	388—400	33d.
71—80	8d.	401—415	34d.
81—90	9d.	416—430	35d.
91—100	10d.	431—445	36d.
101—112	11d.	446—460	37d.
113—125	12d.	461—473	38d.
126—137	13d.	474—488	39d.
138—150	14d.	489—500	40d.
151—162	15d.	501—515	41d.
163—175	16d.	516—530	42d.
176—187	17d.	531—545	43d.
188—200	18d.	546—560	44d.
201—217	19d.	561—573	45d.
218—234	20d.	574—588	46d.
235—250	21d.	589—600	47d.
251—262	22d.	601—615	48d.
263—275	23d.	616—630	49d.
276—287	24d.	631—645	50d.
288—300	25d.	646—660	51d.
301—312	26d.	661—675	52d.
313—325	27d.	676—700	53d.
326—337	28d.	701 and over, per mile, 1½d. per ton	



Friesland bull, "Colantha Sir Cornucopia," imported from America by Messrs. MacLaurin Bros., Salisbury.



THE RHODESIA Agricultural Journal.

*Edited by the Director of Agriculture,
assisted by the Staff of the Agricultural Department.*

PUBLISHED BI-MONTHLY.

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DECEMBER, 1912.

[5s. per annum.

Editorial.

Correspondence on subjects affecting the farming industry of Southern Rhodesia is invited. Enquiries will be replied to direct, or through the medium of the JOURNAL. An interchange of ideas and suggestions between farmers will be particularly welcomed. Contributions of a suitable nature for insertion in this JOURNAL will be much appreciated. All communications regarding these matters, and advertisements, should be addressed to the Editor, Department of Agriculture, Salisbury.

IMPORTATION OF CATTLE FROM AUSTRALIA.—The Director of Agriculture is at present on a visit to Australia in connection with the proposed importation of cattle from that country. Apprehension has been expressed regarding the danger of introducing disease into Rhodesia by such a step, but it may be pointed out that Dr. Nobbs's mission is, in the first place, one of enquiry as to the feasibility and advisability of obtaining cattle from Australia, and the public can rest assured that no importation into this country will take place without the fullest investigation having been made and consideration given to the matter from a veterinary point of view.

Although Dr. Nobbs's visit is primarily made with the object as above indicated, other questions of importance in agricultural matters will also engage his attention.

A FINE BULL.—Facing the editorial page we publish an illustration of the Friesland bull Colantha Sir Cornucopia, imported from America by Messrs. Maclaurin Bros., of Pomona Farm, Salisbury, which animal, we understand, cost the owners a record sum for Rhodesia. Messrs. Maclaurin Bros. are to be congratulated on acquiring a very handsome animal of the most aristocratic milking strain. The bull has wonderful size and depth for his age (much more than the illustration would lead one to suppose) combined with perfect quality and bids fair to become very heavy. It is much to be hoped that he will live to make his influence felt in our dairy herds.

The bull was calved 15th September, 1911, his sire being Colantha Johanna Lad and his dam Mercedes Cornucopia De Kol, a very highly bred and handsome cow with a beautiful udder exceptionally well veined. She has a record of 20 lbs. 7 ozs. butter in seven days, and has produced a daughter that has made over 27 lbs. of butter in seven days. Her sire is half-brother to Aagie Cornucopia Pauline, which made over 34 lbs. of butter in seven days. This latter is said to be the greatest cow in the world. Some fine records have been made with three-year daughters of Colantha Johanna Lad. One made over 28 lbs. of butter in seven days and gave over 90 lbs. of milk in a day. The dam of Colantha Johanna Lad gave 35.22 lbs. of butter in seven days.

While, as already mentioned, congratulations are due to Messrs. Maclaurin Bros. for their enterprise and pluck in buying a first-class dairy bull, it will not, perhaps, be out of place if we take this opportunity of warning the owners and those who may acquire the progeny of this bull that cows of such marvellously developed milking tendencies must have the food requisite to produce large quantities of milk, otherwise only disaster will follow. Such animals have acquired the habit of turning their food into milk rather than flesh to such an abnormal extent that they will endeavour, as it were, to pro-

duce milk, even under the most trying circumstances and even though the milk produced may be little more than water. The result of this is poverty of the cow, poverty of the next calf and ultimate loss. This type of cow can pay, and will pay her owner better than an inferior animal, but only under a system of good intensive farming and modern methods of dairying. Those farmers who recognise this fact and are prepared to act accordingly will do well to keep an eye on the progeny of Messrs. MacLaurin's purchase as soon as it is forthcoming.

TOBACCO SEED.—The tobacco seed obtained by the Department of Agriculture for distribution among farmers in small quantities for experimental purposes is now exhausted, with the exception of the Turkish variety. Some Goldfinder (Virginia) and Zimmer Spanish (cigar) seed grown in Rhodesia has, however, been obtained and will be supplied, upon application to the Tobacco Expert, Department of Agriculture, to farmers wishing to make small trials. The Havana cigar seed, "Vuelta Abajo," has now come to hand and will also be supplied upon application to the Tobacco Expert.

The seed imported by the Tobacco Warehouse, although considerably in excess of the quantity obtained last year, was finished some weeks ago, but the Warehouse has in stock some Rhodesian grown Goldfinder seed, which will be supplied on application.

WINTER FEEDING OF STOCK.—In this number will be found an article written by Mr. H. G. Mundy on "Ensilage," which we commend to our readers for careful perusal. A severe lesson has been learned in the past few months, a lesson which it is to be hoped will be taken to heart. Losses, avoidable losses, of stock from poverty have been deplorably numerous, despite the bitter experience of the past. This is all the more surprising in view of the ease with which winter feeds such as manna hay, oat forage, teff grass, mangels, Kaffir melons, velvet beans, cowpeas, sugar cane, etc., can be grown. It is to be hoped that the time of stress is now past, but we feel confident that farmers will make due provision next year.

TOBACCO BOOK.—Owing to unforeseen circumstances, the publication of the revised edition of Mr. G. M. Odium's book on tobacco culture is postponed, but it is hoped to have the book on sale early in the new year. The book has been thoroughly revised and brought up to date, and will, we feel sure, prove of great service to tobacco growers — in particular to novices at the industry.

OIL TRACTOR.—Probably the first Oil Tractor to be used for farming purposes in Rhodesia was recently imported by Mr. A. Moorcroft, and is now working at his farm, Barassie, Kimberley Reefs. The Tractor is of 15-25 horse power and the makers are the well-known firm of Fairbanks, Morse & Co. The cost of the Tractor landed in Salisbury is £650, which figure of course places it outside the scope of many individual farmers in this country, though there is no reason, if circumstances in the future permit of the Tractor being used economically and with advantage here, why farmers should not employ one co-operatively. The Tractor ploughs a much larger acreage in a day than can be done with oxen, while it is claimed that hard ground which the ox plough cannot touch is broken with ease by the Tractor. With the present cost of paraffin in Rhodesia it is probable that ox ploughing will remain in favour in this country, but at the Cape, where paraffin is much cheaper, Oil Tractors are being used with advantage.

The agents for the Tractor are Messrs. Duffett & Koch, Capetown, who also supply a specially built six-furrow disc plough for use with these Tractors.

DRAFT WATER ORDINANCE.—The attention of farmers is specially directed to the draft Water Ordinance published in the *Government Gazette* of 15th November. The object of the Ordinance is "to determine and control the ownership and use of water and for the promotion of irrigation," and as such is of far-reaching importance to the farming community. The Ordinance has been considerably amended since it was first introduced at the May, 1911, session of the Legislative Council, and it is now a much more comprehensive document than the

original. The Bill as published consists of 72 clauses, and is divided into seven chapters, dealing with the use of water, combined irrigation schemes, water courts, servitudes, change of course of public stream and existing rights, powers of administration, and offences and penalties.

PLANS AND SPECIFICATIONS OF FLUE CURING TOBACCO BARNs.—In this issue we reproduce, with certain amendments, the pamphlet containing plans and specifications of flue curing tobacco barns, which publication, owing to the great demand for it, went out of print some time ago. An ample number of reprints of the article has been struck off and we shall be pleased to supply copies to any persons applying for same.

THE GWELO CREAMERY.—We are pleased to state that the Gwelo Creamery is now under construction, on a site quite near Gwelo Station, the successful contractor being Mr. F. Heap of Gwelo. Mr. A. C. A. Cator is the architect in charge of the work, and Messrs. Johnson & Fletcher, a local firm of engineers, will erect the cold storage rooms, which will have a capacity of about 60 tons butter. The contract for the machinery, including the refrigerator plant, has been awarded to Messrs. Cuming & Co. of Port Elizabeth, who will instal the whole plant as soon as the building is ready. Mr. W. J. Palmer, Commercial Branch, B.S.A. Co., anticipates that, if nothing unforeseen happens, the creamery will be ready for business by 15th February next. The manager and butter-maker, Mr. Elliot, will arrive shortly from Heilbron, O.F.S., when he will make his headquarters at Gwelo.

IMPORTATION OF POTATOES.—Attention is drawn to Government Notice No. 319 of 1912, which will be found amongst the Government Notices at the end of this issue. The Notice sets forth regulations affecting the importation of potatoes into Southern Rhodesia, and supersedes the regulations

contained in Government Notice No. 309 of 1909. The most important change lies in the treatment of potatoes infested with insects or diseases other than warty scab or black scab (*Synchritium endobioticum* Perc.). Under the former Notice such potatoes were sorted at the expense of the consignee, but it has been found in practice that effective sorting of imported potatoes cannot be carried out without altogether unjustifiable expenditure, and it has therefore been decided to abandon this procedure, as calculated to produce a false sense of security amongst purchasers of imported seed, and to subject importers to difficulties and losses not counterbalanced by a corresponding advantage to the Territory. As no practical method is known of ridding imported tubers of such diseases as corky scab, bacterial disease, potato blight, rhizoctonia, etc., or such pests as root gall worm and tuber moth, it follows that the farmer must use his observation to make sure that he is not being provided with diseased seed, the policy of the Agricultural Department being to spread the knowledge of such diseases and pests as widely as possible, and without doubt this policy is far preferable to a system of sorting that fails to attain its object.

With respect to root gall worm, this pest already occurs on certain farms in the Territory, but the tobacco farms at present appear to be free. As this is a serious pest of tobacco, it has been decided to ensure that it will not be introduced to tobacco farms through the medium of imported seed potatoes, and therefore any consignments found to be infested with this pest will be refused admittance. Tobacco farmers must, however, be on the watch not to introduce the pest to their farms by means of potatoes of Rhodesian origin. A tuber shewing the characteristic galls produced by this pest is figured in the issue of the *Journal* for August, 1910.

Farms and Farming in Rhodesia.

THE LOMAGUNDI DISTRICT.

(Contributed.)

The Lomagundi district, which takes its name from Magundi, the paramount chief in that part of the country at the time of the Mashona rising, occupies the extreme north-western corner of Southern Rhodesia, and comprises an area of approximately 14,732 square miles or 9,428,480 acres. The northern boundary of the district is formed by the Zambesi River and the Anglo-Portuguese border. On the west and south lie the districts of Mafungabusi and Hartley, while the eastern border line is formed by the Umvukwe Mountains—a prominent feature in the landscape, in places rising to an imposing height, and furnishing with their foot-hills some of the finest scenery in the country—a confused mass of rocks, forest and rich open valleys.

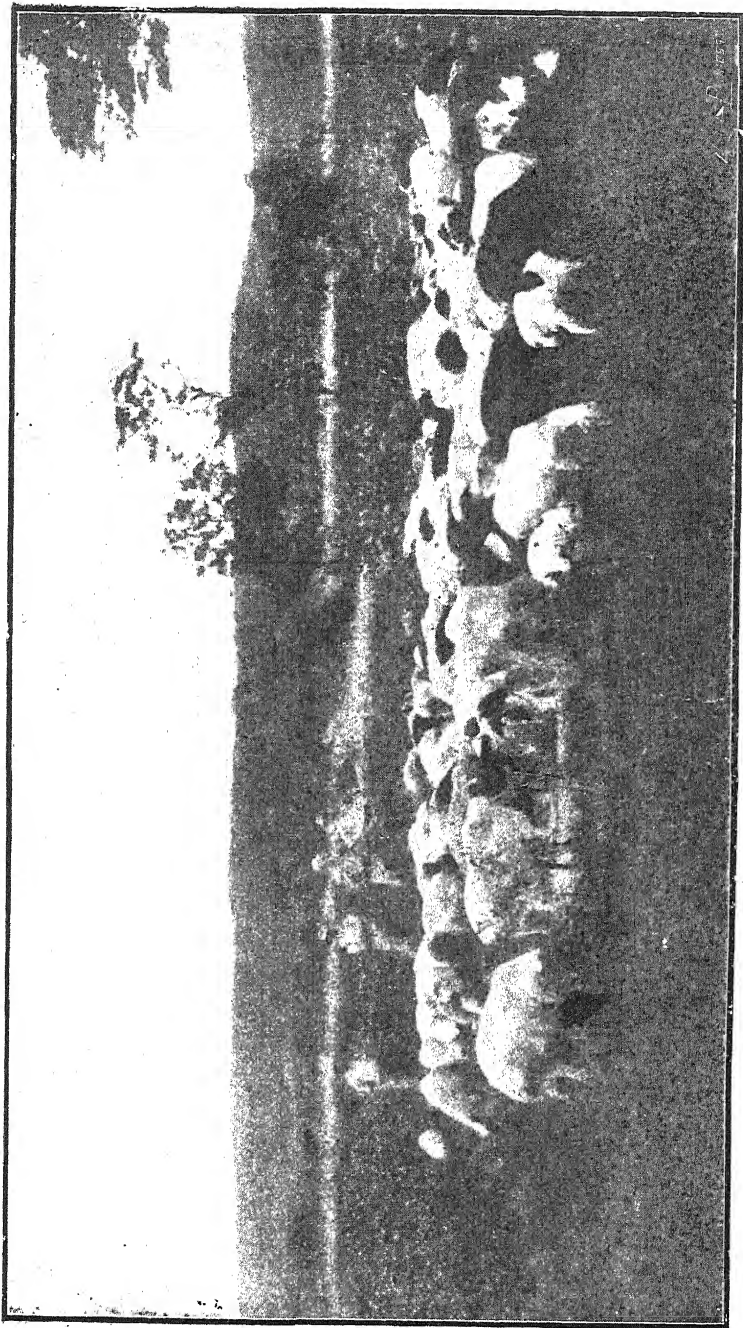
The rise of the Lomagundi district in agricultural importance is a matter of the last three or four years. Settlement is still pushing northwards, and during the last fifteen months several farms have changed hands, while quite a number of hitherto unoccupied farms have been taken up by new-comers. Large tracts of country are occupied by native reserves, and in the north much of the country still remains unsurveyed and but sparsely inhabited. The district relies for its railway communication upon the Lomagundi line, which is broad gauge from Salisbury to Mount Hampden—the junction for the Mazoe and Lomagundi lines—but after this becomes narrow gauge. It is hoped, however, that before long the broad gauge will be continued right through to Eldorado, the present terminus, and perhaps later on even to a point on the other side of the Hunyani River. The advantage of this to the district will be considerable. The transshipping of goods at the

junction often leads to delay, while the present terminus is anything from fifteen to twenty miles from that part of the district where the greater number of "mixed" farms are situated.

The soils of Lomagundi shew variations similar to those of other districts. In the south and west granite soils, with heavier loams in the vleis, are to be found. On the gold belt around Banket, Eldorado and the Golden Kopje, red and black soils are common; while in the valley of the Angwa and on the Umboe Flats as far north as Dickwe are extensive areas of heavy and very fertile black loam, interspersed with timbered spaces which, when cleared, should afford good tobacco soils. In the vicinity of the Sinoia Caves, sandstone and limestone outcrops are noticeable, and these again occur north-west of Sipolilo, where, however, owing to the scarcity of water, the native population is scanty. Between the tracts of country referred to above, numerous lesser variations in soil, including mopani veld, and caused by outcrops of diorite and micaceous schists, are found.

The Sinoia Caves may, with the Victoria Falls, the Zimbabwe Ruins and the Matopos, be ranked among Rhodesian features of special interest. The caves are apparently water-worn in limestone rock. The largest of these now forms a huge pot-hole open to the sky, and at the bottom of which, many feet below the surrounding country, is a small lake of vividly sapphire-blue water. No word picture can adequately describe the beauty of this cave as seen in the early morning, with the bright beams of sunlight piercing the trees which clothe its edge; while these, together with the precipitous sides of the cave, are again reflected in the sparkling water below.

The limestone galleries, which surround one side of the main cave, in times past formed a hiding place of the Mashonas when fleeing from their enemies. Traces of occupation may still be seen, though the galleries themselves are now peopled by bats, which serve a not unuseful purpose in storing up deposits of guano which might well be profitably worked for use as a fertiliser on the surrounding farms. On Mr. Gordon's farm Nyaro, west of the Alaska, bat guano deposits are found in somewhat similar caves, and are, it is understood, being used by Mr. Gordon with good results.



Sheep on Mr. E. A. Ankett's farm Baruka, Lomagundi.



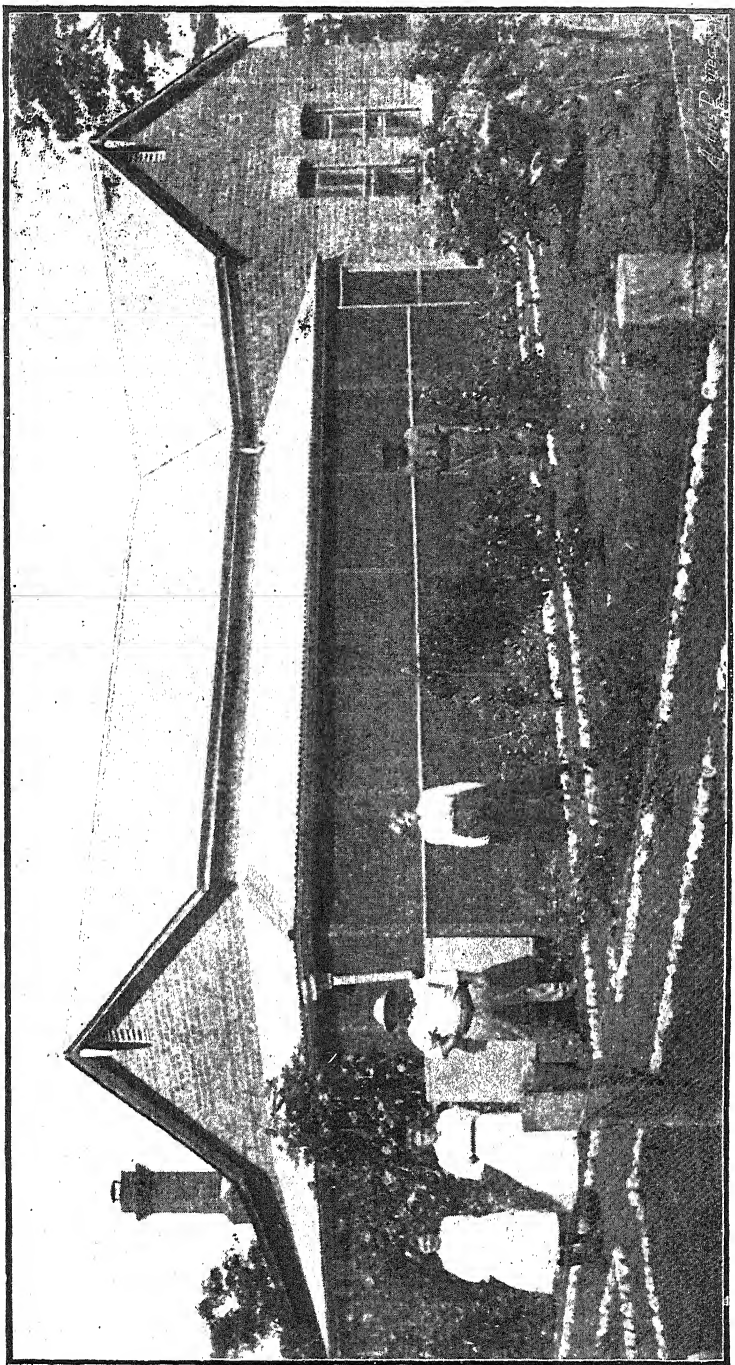
Darwendale. —Persian ewes, with four months half-bred Merino lambs.



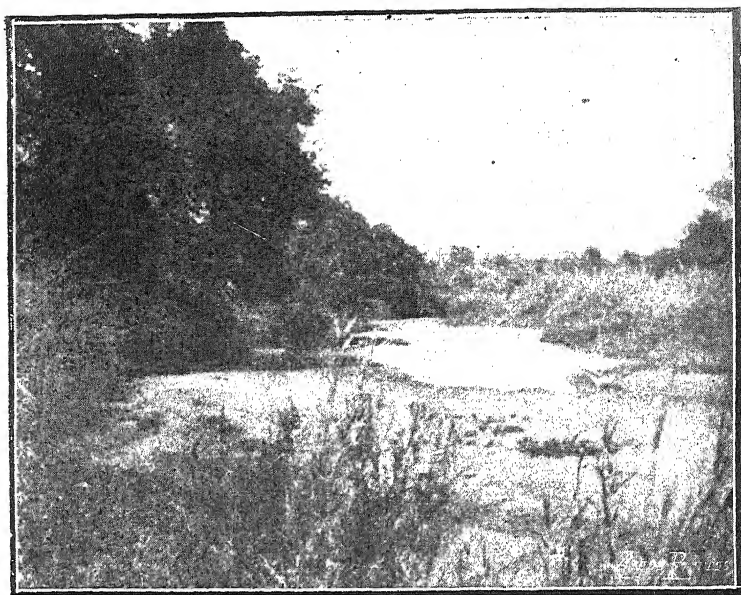
Darwendale. —A draught of two-tooth Shorthorn bulls.



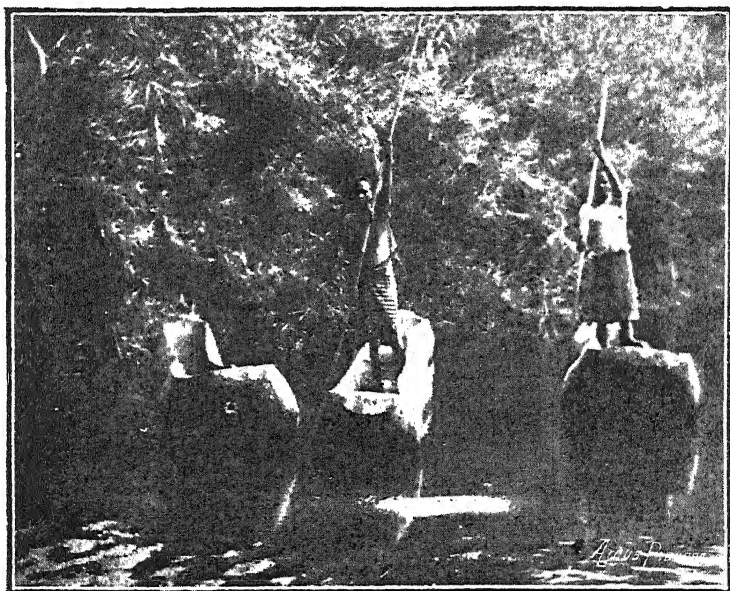
Darwendale.—Loading tobacco for warehouse in Salisbury.



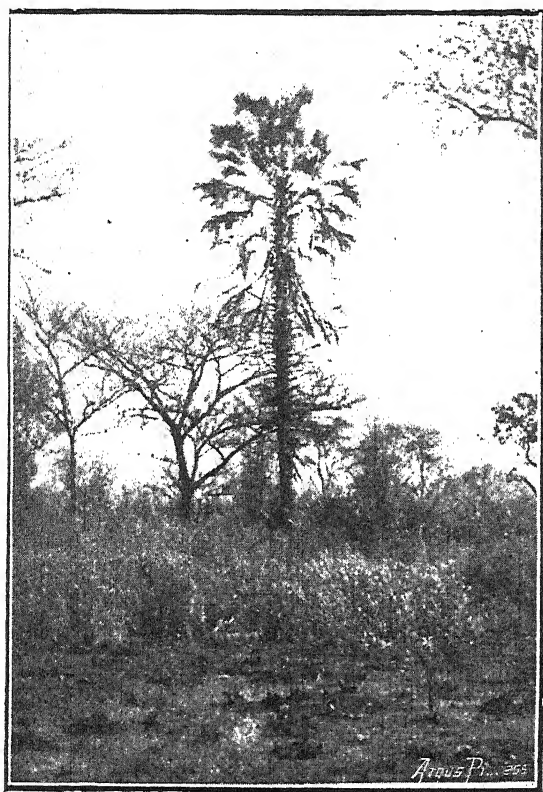
Homestead on Mr. H. Kneiser's farm, Eldorado.



Hunyani River, near its junction with the Ambi River, in November.



Dug-outs on the Hunyani River.



Palm near lower reaches of Hunyani River,
Lomagundi.

The most important mines of Lomagundi are the Eldorado and the Golden Kopje, and to the existence of the former the district largely owes its present position, for without the market which this mine has afforded there would until recently have been but little local sale for farm produce. The Golden Kopje also is now becoming a large consuming centre, and a number of farms in close proximity to it have recently been taken up. Other smaller mining propositions are in various stages of development, while the deserted sites of the Alaska Copper Mine and the Ayrshire Mine are significant symbols of transient metalliferous glories.

As has been said, Eldorado is the terminus of the railway, while a few miles distant across the Hunyani River is Sinoia, where are situated the Government Offices, Police Camp and Hospital. One Farmers' Association serves the whole district, the monthly meetings being held at Sinoia. Thanks largely to the energy of Mr. Keigwin, the Native Commissioner, the sporting and athletic tastes of the community are also provided for, and Sinoia can boast of an excellent golf course, tennis courts and racecourse.

A considerable portion of the Lomagundi district is infested by tsetse fly, but, unlike other parts of Southern Rhodesia, the infested areas are of a decidedly patchy nature. The information available regarding the distribution of the "fly" in the remoter portions of the district, especially to the north-west, is not by any means complete, but scattered "belts" are known to occur there. As far as is known, the Zambesi itself is free from "fly."

The largest "belt" is bounded to the south by the escarpment (Rukowakuona Mountains). It extends eastwards towards the Mazoe border, but its limits in this direction have not been ascertained. Its northern limit along the Hunyani is the junction of that river with the Ambi River. To the west of the Hunyani it extends practically to the Angwa River, the northernmost point along this river being within a few miles of the Portuguese border. The "fly" is most prevalent below the escarpment east of the Hunyani River.

Further south the country between the Hunyani and the Angwa Rivers, north of Tchetchenini Hill, is infested, the

"fly" being thickest about ten miles north of Tchetchenini Hill, while in the south-west of the district "fly" is reported from the neighbourhood of the Piriwiri River.

The "fly-free" part of the district may be said to include that portion lying south of the region of the Piriwiri River, east of the Angwa River, south of Tchetchenini Hill, and east of the Hunyani River south of the escarpment. To this may be added the country in the neighbourhood of the Zambesi River.

It is possible to take cattle by certain routes to the north-west part of the district. The road from Sinoia to Urungwe is reported free from "fly," for instance; but, in general, good local knowledge is needed to avoid the scattered "belts" in this part.

The number of beneficially occupied farms in the district appears to be between fifty and sixty and all types of farming are to be met with — from ranching to arable farming pure and simple. On the western slopes of the Umvukwe Mountains it is mostly ranching which is practised, and the foundation cattle are derived from Angoni, Nyasa and Victoria stock, amongst which imported Shorthorn bulls are running. Until recently, bulls of various types have been used, but of late the Shorthorn seems to be generally accepted as the most suitable improving blood. The cross-bred calves shew an enormous improvement over the native stock, and the rich sweet veld seems obviously suited to the Shorthorn breed, as the cattle require to walk but little distance for their food, and there is ample water all round and abundance of shelter in the form of bush. There are also a number of half-bred Aberdeen Angus cattle, and these are remarkable for their smoothness, their condition and their similarity one to another, shewing the good effect of the sires used.

Such cattle as these are found on the properties of the Thornycreek Ranching Co., Lone Cow Estate; Messrs. Gordon & Robertson, on Kashao; Mr. Woods, on Birkdale; and Mr. Peake, on Umvukwe Ranch. The chief drawback to this part of the country is the prevalence of lions and leopards, numbers of which are being constantly destroyed, but not as a

rule before they have taken their toll of cattle or calves. Situated at the extreme south end of this range of hills, where the country is lower and much more free from bush, is the ranch Darwendale, the property of the Rhodesia Ranching Co. (Messrs. Dimmock & Zimmerman). On Darwendale, Shorthorn and Aberdeen Angus bulls are being mated with native cows, and excellent results are being obtained. Photographs illustrating the marked improvement in type and carcass of the cross-breds have appeared from time to time in the *Rhodesia Agricultural Journal*.

As one travels westwards the land becomes better suited to "mixed" farming, and several farmers are now building up small herds of graded Shorthorn and Friesland heifers with a view to forming a dairy herd in conjunction with "mixed" farming. Friesland cattle appear to do particularly well in the Angwa Valley, and the small herds on the farms of Mr. Struthers and Mr. Pickering shew good promise. Two Ayrshire bulls have also been imported into the district, and the breed will probably be adopted by a few farmers, should the dairy industry of the neighbourhood develop, notwithstanding the fact that the soil is well suited to carry a heavier type of animal. On this side of the district the B.S.A. Company have a number of cattle running with Africander bulls, and it would be difficult to find a more even lot of young stock than some 100 head of yearlings to be seen on this farm. Messrs. Harvey & Anderson, on the farm Haltondale, have adopted the Aberdeen Angus type, and, notwithstanding the loss of one or two bulls, have a stud animal now of excellent quality, which is being used on northern heifers already possessing an Aberdeen Angus cross. The calves of these heifers, which are just coming on, are very encouraging.

Statistics place the total number of breeding stock owned by Europeans in the district at about 5,000, and of draught and slaughter stock at about 3,000. These figures are, however, only approximate, since in the case of large herds the present season's crop of calves should mean a very considerable increase in the total number, and the figure will be further affected by any importations of Colonial or Victoria cattle which have recently occurred.

Sheep are not at present run very largely, and about 1,200 to 1,500—mostly cross-bred Persian and Cape or native—seem to be the total for the district. In many places the veld is as yet too rank for sheep, while on the outlying farms the presence of so many wild carnivora renders the existence of small stock somewhat precarious. Pigs are kept in considerable numbers by several farmers, but thus far little superior blood has been introduced, and the animals are mostly not of the best type. Bacon and hams have been locally cured and disposed of, though at the time of writing it is probable that owing to the scarcity of grain and other feed, the pig industry in the district is not in a very flourishing state. There seems no reason why pig breeding with a view to supplying the Bulawayo factory should not prove profitable, however, and the next year or two should see a considerable increase in the number of pigs kept in the district.

It is estimated that some 4,000 acres are planted to maize, and this, with tobacco, is the staple crop of the district. The main grain-growing centres lie on both sides of the railway line between Banket Junction and Eldorado, and in the neighbourhood of the Golden Kopje Mine, while in the vicinity of the headwaters of the Angwa and on the Umboe Flats there are fine stretches of land suitable for arable farming, and equal in fertility to any in Rhodesia. Owing to distance from rail-head and mine market, much of this splendid land still remains unimproved veld, and in many cases carrying but small numbers of stock. The day will undoubtedly come, however, when land of this character will be worked intensively, and will prove its capability of supporting a much more closely settled farming population than is dreamed of to-day.

The localities outlined above are essentially suited to general "mixed" grain farming and dairying, while other parts of the district—as, for instance, the country to the north-west of the Angwa River, the western slopes of the Umvukwe Range and the vicinity of the Ayrshire Mine—shew themselves better adapted for stock and tobacco.

But little irrigation has yet been attempted; and indeed, taking the district as a whole, the surface water supply in the localities best suited to arable farming is not over abundant.

In particular is this the case on the Umboe Flats, where recently it has been found necessary to put down several bore-holes. In spite of this, however, there are numerous farms where in a normal season small acreages may be found suitable for growing winter crops of onions and green forage and early spring crops of potatoes without irrigation.

Tobacco is gaining in popularity, and probably about 500 acres will be planted to this crop during the coming season. Among the chief centres of tobacco growing at present may be mentioned the neighbourhoods of Umboe, Darwendale and Clydesdale, but the sandstone soils in the north of the district, as well as much of the granite country, seem admirably well adapted to growing bright Virginia tobacco, and, if prices are maintained, in the future the Lomagundi district should shew a large output of high-grade leaf.

Rotation crops are not yet grown to any great extent, but there is a distinct opening for these; and monkey nuts on the lighter soils, and ordinary beans on the heavier soils, might well be grown extensively, with a view to supplying the Eldorado and Golden Kopje Mines and the Labour Bureau Depots, while any available surplus could usually be readily disposed of elsewhere in the country.

Comparatively little has been yet done with citrus fruits or deciduous fruit trees. The oldest established orchard in the district is that laid down by Mr. Howell on the Land Settlement Farm, Sinoia. On an exceptionally fine piece of land, watered by a stream from the kloof above, fruit trees of all descriptions have done remarkably well, and a useful demonstration has been given of what may be done, given good land and a water supply, in the way of market gardening and vegetable growing. As a site for a citrus orchard the position is somewhat too low-lying, and it is probable that fruit grown on soil containing as much nitrogenous matter as does this, will be inferior in flavour, and particularly in keeping quality, to fruit produced on less naturally fertile and more sandy soils.

A lime deposit occurring in the form of a travertine or vlei lime is being worked by Messrs. Bradfield & Crawford under the title of the Sinoia Lime Works, and the product is

of very good quality—suitable either for cyaniding or agricultural purposes. In this respect it differs from the dolomitic limestone in which the Sinoia Caves occur; with the latter the percentage of magnesia is too high to recommend the lime obtained for agricultural use.

As has been said, the majority of the Lomagundi farmers have not yet been sufficiently long established to bring their farms to anything approaching their normal producing capacity, but the comfortable houses to be found on most of the farms, the increase in stock (both natural and induced by importation), the large number of well bred or greatly improved bulls running with the herds, together with the good quality of the maize already grown and the large stretches of fertile soil still awaiting the pioneer plough, afford ample proof that the Lomagundi district, though but recently occupied, will by no means be the last in the march of progress.

Draining with Dynamite.

A good deal has been heard recently of the use of dynamite and other high explosives in the removal of tree stumps and for breaking up hard subsoils in the orchard, but the latest application of the explosives is in the drainage of swamps. Such swamps are often caused by the surface waters which collect on low ground failing to percolate through a comparatively thin layer of impervious clay. The water is held as in a saucer. A Kansas farmer owned a 40 acre swamp of this kind on his land and he proceeded to tap it. Across the lowest part, where the water was about 3 feet deep, he blasted a row of holes. In a few days the water had disappeared, and in the following season he is said to have reaped 1,600 bushels of oats from the 40 acres. Since then he has produced four cuttings of lucerne annually on this land.

Tobacco Culture.

SEASONABLE HINTS.

By J. W. LEWIS, Tobacco Expert.

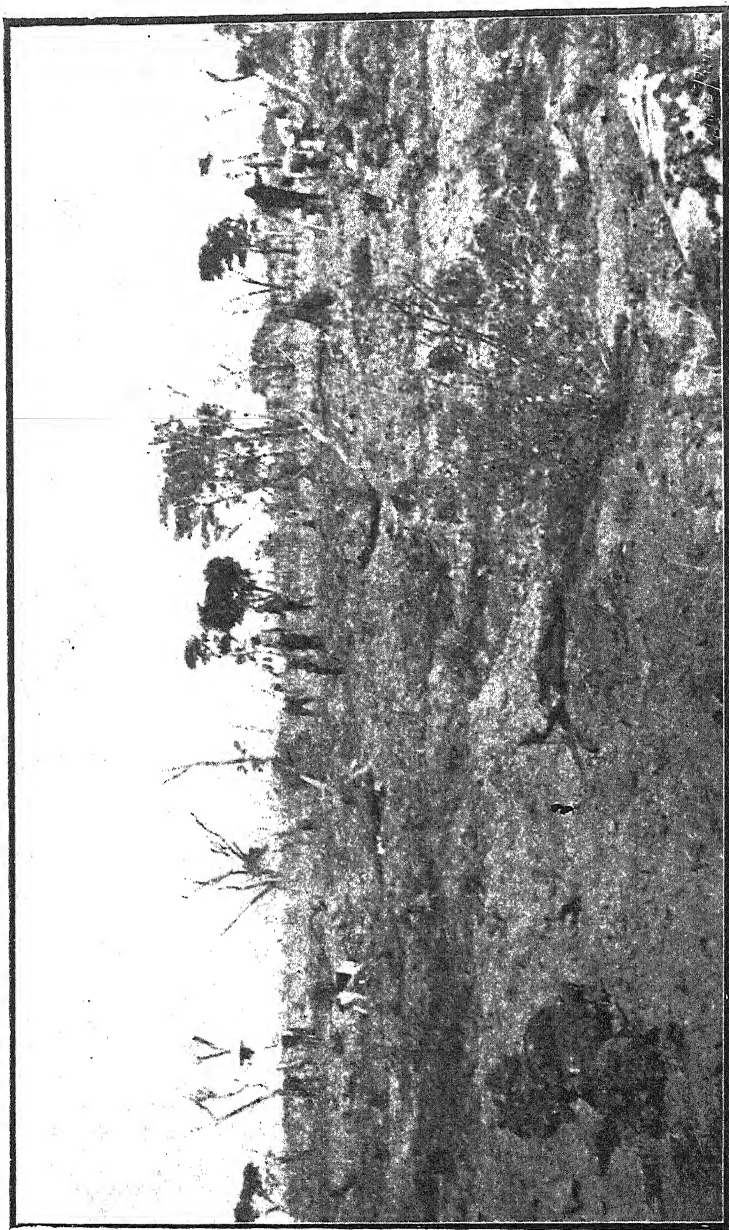
By the time these notes are published it is to be hoped that the drought which is causing such distress throughout South Africa will have broken, and that sufficient rain will have fallen to permit tobacco growers planting out. There has been a large addition to the ranks of Rhodesian tobacco growers this season, and the demand for seed has been so great that the stock at the Warehouse, although considerably in excess of the quantity previously obtained, was exhausted some weeks ago. Given a fairly favourable season, next year's crop should constitute a record, though the late crop is estimated at about a million and a half pounds (weight). With such a production it is probable that the buyers will not touch inferior leaf, which has hitherto found a sale at a certain price, and growers may find that unless a good class leaf is grown it will be left on their hands.

PLANTING TOBACCO.—This is a matter of great importance and requires careful attention. If the plants are not well planted the growth will be irregular. Very great care must be taken not to break or bruise the plants in drawing them from the bed or in conveying them to the field. Never set out a plant that is bruised or damaged. The holes must not be deeper than the plants are long, and care must be taken to see that the earth is well put to the roots. There are two methods of growing the plants: one is known as level cultivation and the other as hill or ridge cultivation. With the former system the field is marked off into rows, 3 to 3½ feet apart, and the plants set at the distance of 3 feet in the rows. If it is desired to use the horse cultivator in both directions, the field is marked both ways, so that the plants will “check row.” With

hill planting the field is thrown up in ridges, $3\frac{1}{2}$ feet apart, and the tobacco set on the tops of these ridges. The ridges are formed with a small plough or with a horse cultivator, using the wing adjustment. Each method is followed in Rhodesia, but hill planting is recommended for reasons previously given. If the day be cloudy, planting may be done at any time; but, if the day be hot and dry, the planting should be left until the last half of the afternoon, so as to give the plants an opportunity to recover and establish themselves during the coolness of the night.

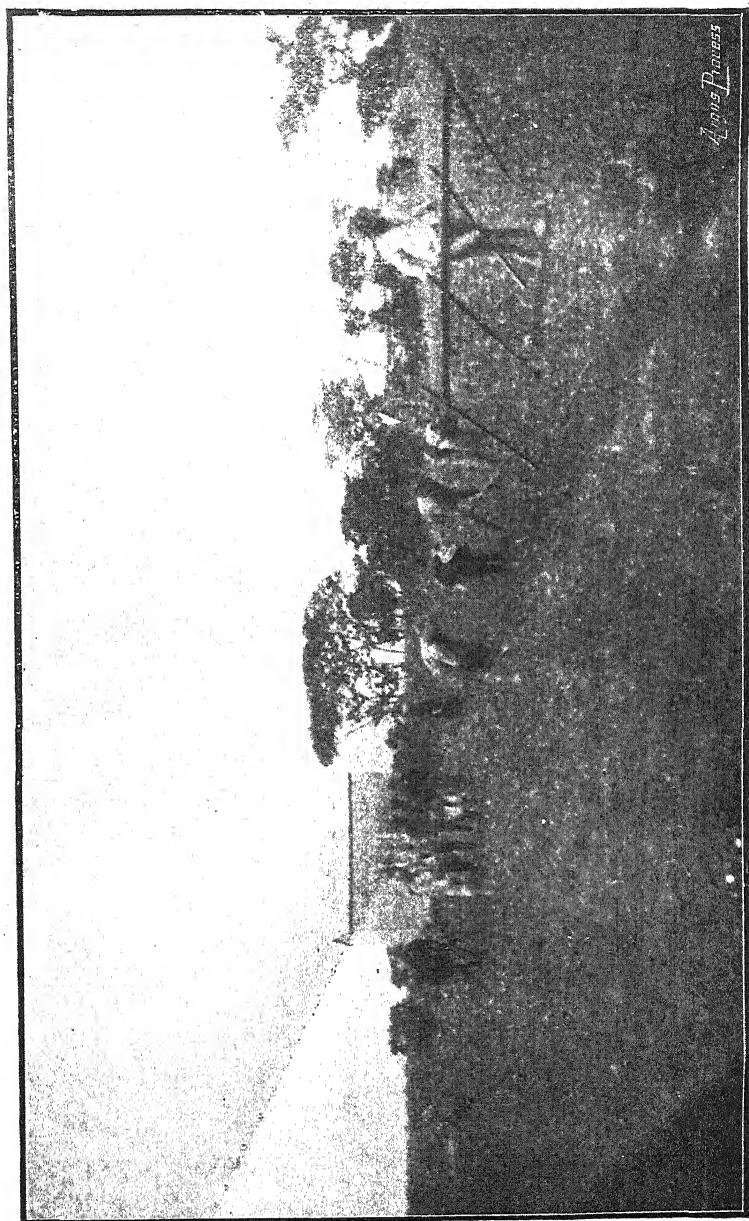
CULTIVATION.—As soon as the plants have taken root, so that there is no danger of killing or damaging them in any way by working, cultivation should commence. Cultivation is too often neglected in this country, but it is a matter of primary importance. Whether there are any weeds or not, cultivation must be done as early as the condition of the plants will permit. Cultivation is not merely for the purpose of killing the grass, but also for the admission of the air necessary to the roots of the plants as well as to the nitrifying bacteria. After wet weather, cultivation hastens the drying out of the soil; and in dry weather, cultivation, by the creation of an earth mulch, prevents excessive evaporation.

With level cultivation, when the plants have started to grow, the first cultivation should be done with a small horse cultivator, which should work up one side of the row and down the other, as near the plants as possible without damaging them. Some growers in this country work the cultivator down the centre of the row only, but this method is not to be recommended, as the earth in the vicinity of the plants is not stirred. Subsequent cultivation should take place every week or ten days, as the condition of the land requires, but a cultivator with larger hoes should be used from now until the last cultivation, when a broad-winged shovel plough should be run down the centre of the rows in order to throw the earth round the plants, thus forming a ridge. A rapid growth from the time of planting until the ripening period will give that fine, even texture so desirable in high class tobacco. When the plant is ready to be topped, cultivation should cease, for any further stirring of the soil will tend to induce an injurious second growth.



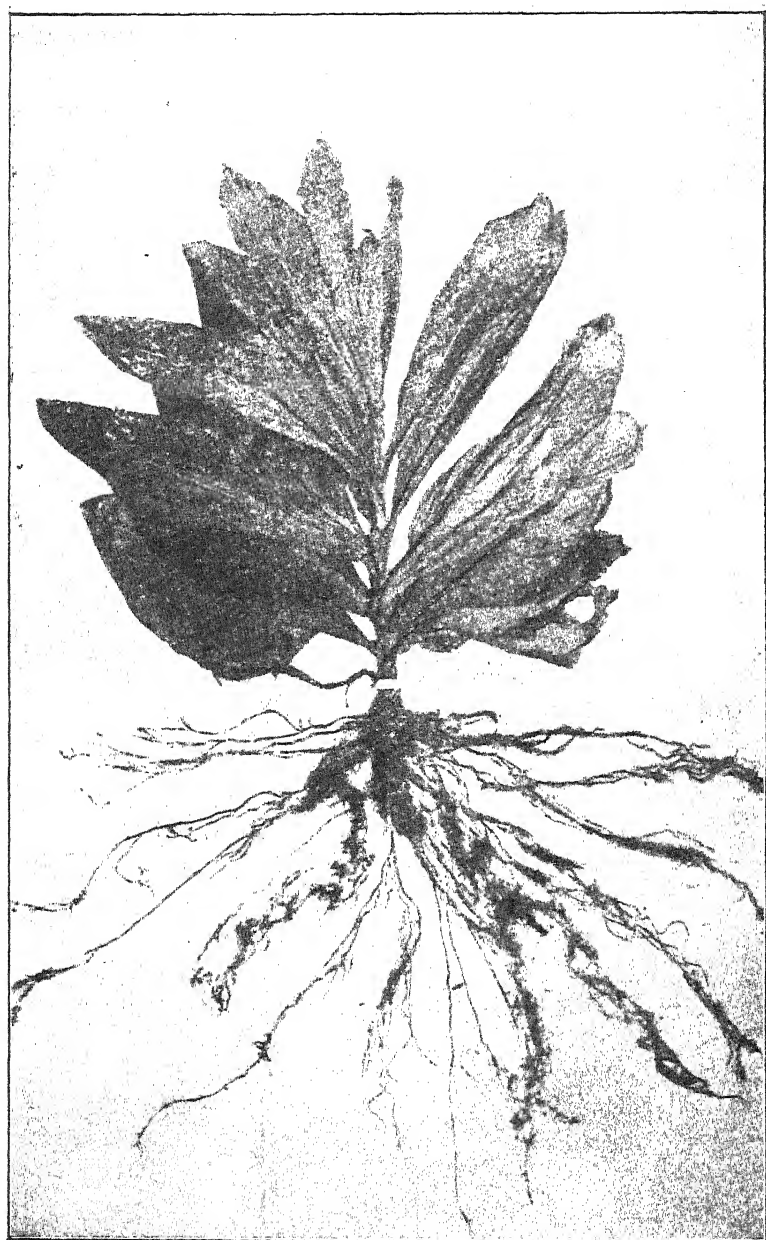
Clearing Land for Tobacco at Chudleigh, Marandellas.





Miss Pinner

Planting out Tobacco at Chudleigh, Marandellas.



Shewing the root system of a Tobacco Plant.

FERTILISING.—With level cultivation, the fertiliser is placed round the plants as soon as they shew signs of growth. The system generally in use here is to place the fertiliser around each plant in a shallow circle about 6 inches in diameter, but a saving of labour would be effected if the fertiliser were dropped at the side of each plant, just in front of the cultivator, which, when worked close to the plants as we advocate, would throw the fertiliser to the plant and cover it over. The quantity of "Safco" applied to each plant should be a tablespoonful, which works out at about 200 lbs. to the acre. When the tobacco is planted on ridges, the fertiliser can either be applied by hand around each plant in the manner already mentioned, or it can be drilled in. A mealie planter with a fertiliser attachment is generally used in this country for this purpose, and for the present gives satisfaction.

PRIMING.—As soon as the plants are large enough to bear priming without injuring the stalk, the bottom leaves must be taken from the stalk. This will supply the plant with food, and will also give the upper leaves a better growth. Keep up the priming until the bottom leaves are clear of the ground.

TOPPING.—It is a difficult matter before the operation to say how tobacco should be topped; in fact, it is difficult then, as so much depends on the season. However, in Rhodesia, with the demand for bright thin tobacco, it may be taken as a general guide that it is better to top too high than too low. Still, the aim should be to produce a tobacco with some body or oil in it, as thin lifeless tobacco has no weight. I would recommend that tobacco grown on light sandy soil, or tobacco that has the appearance of being light or of poor growth, should be topped as soon as the button (or seed head) appears. Heavy tobacco should be allowed to blossom, and should be topped high, for this will have a tendency to make it thin and light.

SUCKERING.—As soon as the plant is topped, or even before, small shoots or suckers start out from the axils of all the leaves. If these suckers be allowed to grow, they will greatly lessen the amount of tobacco produced, and also injure the quality. As soon as the suckers appear they must be broken off. This will have to be repeated at least once a week. The work can easily be done by children, but care must be taken that the remaining leaves are not broken off or injured.

RIPENING.—This is hastened by the topping and suckering operations. The remaining leaves are filled with an abnormal accumulation of organic compounds that would have been used for the development of seed and other leaves had the tobacco plant been allowed to mature normally. The plant at this stage largely increases its percentage of acids, nicotine and protein compounds. A ripe leaf has a rough feeling to the touch, and when folded between the fingers will easily crack. There will also be a change in colour from a dark to lighter shades of green, and the appearance of yellow spots. This indicates the maturity of the leaves and the translocation of material from the older portions to the less mature leaves of the plant. A brownish colour may also appear around the borders of the leaf. A leaf if harvested too green will always have a tendency to retain a greenish shade, and will be deficient in grain and slightly bitter when smoked. There is also such a thing as an over ripe leaf. Over ripe leaves contain more water and less organic material than they did when at the proper stage for harvesting. This is due to the fact that in the ripening leaf the chlorophyll grains gradually change to other forms, and thus cease their function of forming new organic matter, while at the same time consumption of the already stored material continues. An over ripe leaf will seldom cure up an even colour and will be brittle rather than elastic.

The ripeness of shaded tobacco cannot be determined by the same indications as can the sun-grown crop. A general appearance of maturity is the only guide that the planter will have.

Two Enemies of Tobacco.

CUTWORMS AND MINERS.

The following notes on two important enemies of growing tobacco in Southern Rhodesia have been prepared for the assistance of the rapidly growing number of planters in this Territory, and more particularly for the newcomers, who through inexperience of tobacco pests might suffer severe and unexpected losses during the early stages of their undertaking. In the past the profits of tobacco growing in the Territory have left a considerable margin, sufficient in the usual way to more than cover losses sustained from insect attack, but with the rapid increase in the number of acres placed under this crop, and the consequent increase in supply, it must follow as the natural sequence of events that competition will become keener and profits be lessened in time. It is then that the enterprising planter will have to give more attention than at present to saving as much as possible of that percentage of his crop which now goes to feed his insect enemies. The reason that in the tobacco growing parts of the United States of America it is found necessary to wage constant war against insect pests from the seed bed to the barn is not solely that the planter there is troubled with "hornworms" and "flea beetles," such as have not put in an appearance in South Africa, but that the profits are so finely drawn that he cannot spare to insect attack the smallest percentage he is able to save by adapting the results of scientific research to his own needs. "Hornworms" and "flea beetles" do not seriously attack tobacco in this country, but the "tobacco miner," known in America as the "splitworm," seems a far more serious pest here than in the States, whilst the ravages of cutworms are not surpassed elsewhere. Although such disasters do not usually happen, either of these pests is capable under favourable circumstances of rendering a crop unprofitable even under the high prices which have obtained in the past. It behoves the enterprising grower to take measures to avoid such setbacks, and to increase the profit on his crop to the utmost.

CUTWORMS.

This name originated in the United States of America, the term "worm" being erroneously applied to caterpillars generally, and the full name referring to the insect's habit of severing the stems of plants close to the ground. In England these insects are called "surface caterpillars," and this name is more legitimate than the other, but crisp and euphonious terms have a way of establishing themselves, and it would be useless to attempt to dislodge the name "cutworm" from general use in this country. The Cape Dutch call these insects "mestwurmen," but the name is also applied to the whitish grub of certain beetles, many of these grubs feeding in manure. The name "mestwurmen" as applied to the insects under discussion is, of course, absolutely incorrect: because in the first place they are not worms, and secondly they do not in the usual way feed in manure. As they are, however, likely to abound wherever a rank and succulent vegetation exists, they are common enough on the borders of manure heaps.

Cutworms are the caterpillars of a number of different species of night-flying moths of inconspicuous brown or grey coloration. In Southern Rhodesia there are several species more or less injurious. Six species have already been separated out at the Agricultural Laboratories, and no doubt there are more that will come to light in time. One of the commonest species, *Agrotis segetis*, known in England as the "turnip moth," is figured at Plate I., fig. 6. Another, *A. ypsilon*, the "greasy cutworm" (Plate I., fig. 10), appears to be especially fond of tobacco seed beds.

In general, the habits of cutworms are simple. The gravid female moth selects a situation amongst suitable vegetation and deposits her eggs on the stems of plants or on some convenient object near by. The eggs hatch in a few days. In India the eggs of the "greasy cutworm" are reported to hatch in as little as one and a half days, but the time taken by most species is usually considerably longer. The young larvæ enter the soil, where they mostly lie concealed during the day, feeding at night. The time taken by a larva to attain full growth varies with the season of the year and the quantity of food available. A number of larvæ of one species, bred from egg to pupa in the laboratory with abundant food and mois-

ture, began to change to pupæ on the thirty-eighth day, and had practically all changed by the fortieth day. On the other hand, cutworms are quite capable of fasting altogether for several weeks, and taking up the thread of their development again after this period, so that the duration of the larval stage is very variable indeed. The exact influence of temperature, moisture and food supply on the life histories of our common cutworms calls for investigation, and is at present receiving attention at the Agricultural Laboratories. It is especially desirous to ascertain the behaviour of the insects during the dry period of the year, when the night temperatures are low, when the amount of moisture in the atmosphere is very small and the food supply is very short. This has a direct bearing on the origin of the cutworms that damage the tobacco seed beds in the very early spring, before the first rains have fallen. The practical point is to determine when the eggs are laid that produce these early cutworms, and under what conditions they thrive. Knowledge on this point might enable us to devise economic means of altering these conditions and checking the development of the pests.

The pupa or chrysalis stage is passed in the earth. Most species construct cells of earth bound together by some gummy substance which hardens on drying. These cells doubtless serve to shield the pupa from sudden changes in temperature and from contact with water. Some species, however, form loose cocoons mixed with particles of earth, in which they undergo their final change. The duration of the pupal stage is very variable. In India, where the "greasy cutworm" has been studied in some detail, the pupal period is given at from ten days to a month. In this country one species has varied from about twelve days to six weeks, whilst another took twenty days. *A. segetis* has been found to vary from a fortnight to thirty-eight days in the pupal stage. It has been found that the prolongation of the larval stage through fasting has a considerable influence in shortening the subsequent pupal period. This phenomenon was first observed in Europe. Larvæ of one species bred at the laboratory that had been starved for about a month remained in the pupal stage for about twelve days, whilst from the pupæ of similar larvæ

supplied with abundant food, no moths emerged in less than six weeks. The pupal stage in general is much longer in winter than in summer.

The female moth lays a large number of eggs. Mr. Ghosh, working at Pusa in India, gives the maximum number counted from a single female of the "greasy cutworm" at 344. At Salisbury, Mr. R. L. Thompson, Assistant Entomologist, counted 342 from a single female of an injurious species. Thus the capability for rapid increase is considerable, and the progeny of a very few females, if unchecked, are sufficient to destroy the plants over a considerable area of seed beds.

Preventive Measures.—The incompleteness of our knowledge of the life histories of injurious cutworms in this Territory is a considerable hindrance in the devising of measures for preventing cutworm attack in tobacco seed beds, but the few facts that have been ascertained are helpful as far as they go. Measures of prevention must aim at two things: (1) to see that the seed beds are free from cutworms when the seed is sown, and (2) to prevent them from becoming infested after the plants are above ground. To ensure the former, the beds should first of all be thoroughly burnt over with wood or dry tobacco stalks. This is usually done in Southern Rhodesia, but burning the beds alone is not sufficient, owing to the presence of cutworms in the surrounding ground. To get rid of these, the use of *poisoned bait* is recommended. This is an old and well-known method of destroying cutworms, and several different formulæ are used. A formula recommended in the United States of America consists of:—

Paris green	1 lb.
Molasses	2 quarts
Wheat bran... ..	50 lbs.

The bran should be made into a mash of the consistence of porridge, with the molasses and sufficient water. The Paris green should then be thoroughly stirred into the mash. Maize may be substituted for bran and arsenate of lead for Paris green.

The Mally formula recommended in Cape Colony is as follows :—

Arsenite of soda... ..	1 lb.
Treacle or black sugar	8 lbs.
Water... ..	10 galls.

The arsenite should be dissolved in about a pint of boiling water and added to the treacle or sugar solution. Arsenite of soda is a cheaper and more rapidly effective poison than Paris green. This solution can either be used to make up a mash with bran or meal, or if any green stuff is available, it can be chopped up finely, wetted with the poison and distributed broadcast but very thinly over the ground. The poisoned bran or meal is usually distributed in spoonfuls about the ground, and it remains moist and attractive longer if placed under a piece of board or anything that will keep the sun off. It is possible that maize meal is not quite such a good medium as bran to carry the poison, but the meal is present on every farm; whilst bran, which is also a rather more expensive material in this Territory, would have to be purchased specially. Cutworms will eat sweetened meal quite readily when fresh, and in cage experiments have shewn little preference for either bran or meal. The chief drawback to meal is that it dries out into a very hard and solid mass. The use of chopped greenstuff, of course, lessens the expense considerably, but unfortunately greenstuff is very scarce on most farms in September, when the seed beds are being prepared. If irrigation is being practised or an early crop is being grown on naturally moist ground, greenstuff will be the cheapest material to use. There is, of course, no difficulty in growing a quantity of lettuce or other hardy vegetable to furnish greenstuff for baiting purposes.

It must be borne in mind that tobacco seed beds in the months of October and November constitute an attractive array of succulent vegetation, when succulent vegetation is scarce elsewhere, and that cutworms are likely to be attracted thither from some distance round. It is advisable, therefore, to clear the ground for about 30 yards in all directions round the beds, and to bait this ground thoroughly before sowing. If the beds are in a rich vlel, as they usually are, the surrounding

veld is liable to contain cutworms in September and October. The clearance will leave a wide margin over which the cutworms would have to travel to reach the seed beds.

Whatever form of bait is used it should be distributed towards evening to avoid the drying effect of the sun's heat. The bait is most effective the first night after distribution, and if the ground treated has been cleared for some little time the cutworms will be hungry, and the great bulk should find the bait and poison themselves during the first night. The baiting can be repeated with advantage a week later.

To protect the beds from becoming infested with cutworms after the plants are above ground, the greatest care should be given to the soundness of the covering material, to its proper adjustment each night, and to the tightness of the bricks enclosing the beds. The aim is to exclude the adult moths which are liable to be attracted by the array of green to deposit their eggs on and about the plants. The plants are above ground in the seed beds for nearly seven weeks, whilst cutworm eggs hatch in from a week to ten days, and it has been found in the course of feeding experiments in Salisbury that the larvæ of one species attain the length of three-quarters of an inch in about seventeen days, and are then entering upon a very destructive period of their life, and are capable of severing plants of some size. In twenty-eight days the length had reached one inch, and from this time forward for about eight days, when the insects began to pupate, their appetite was very voracious and their growth very rapid. It will be seen, therefore, that eggs laid on the young plants produce cutworms that increase in size with the plants, and are big enough to sever the plants when nearing a condition of suitability for planting out. When it is remembered that a single female moth may lay upwards of three hundred eggs, the desirability of excluding them from the seed beds is obvious. Cutworm moths are nocturnal in habit, so that the coverings of the beds need only be moth-proof at night. A tour of inspection round the seed beds the last thing in the evening should repay the trouble. This method can hardly be relied upon to exclude all the moths, as some are likely to find their way in through any opening that is left.

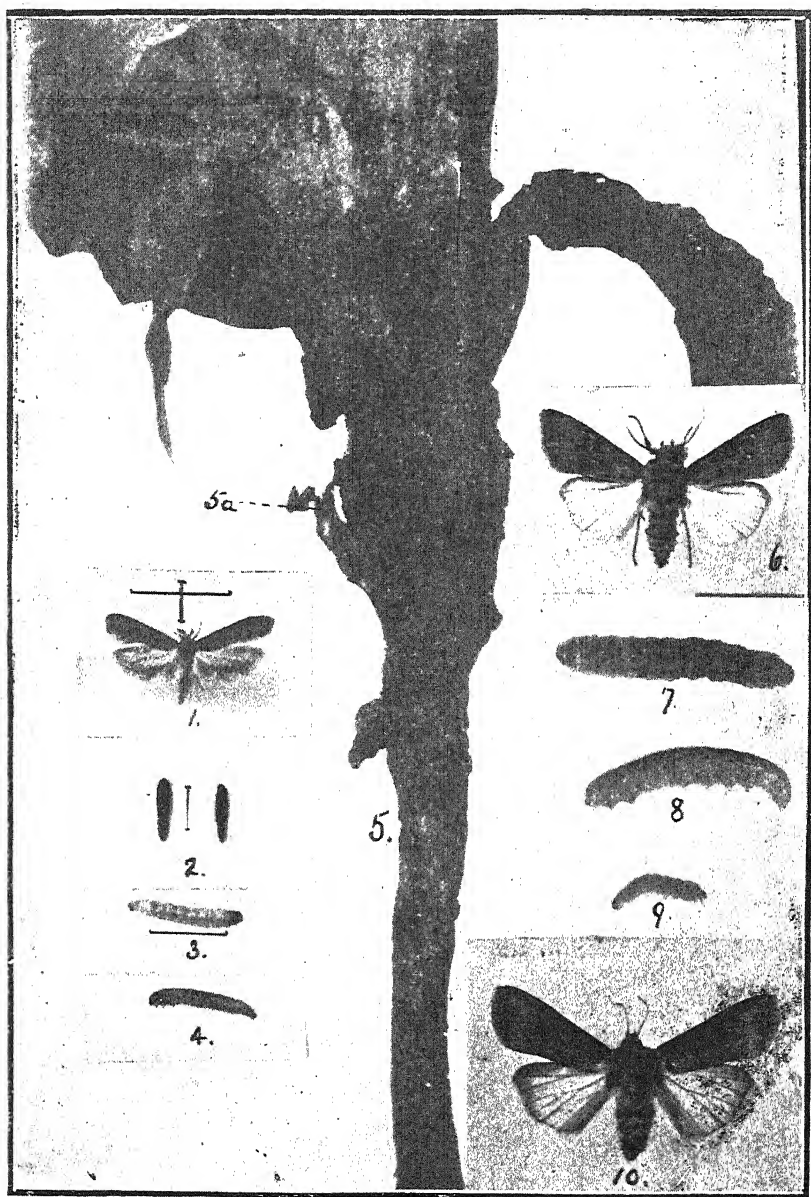
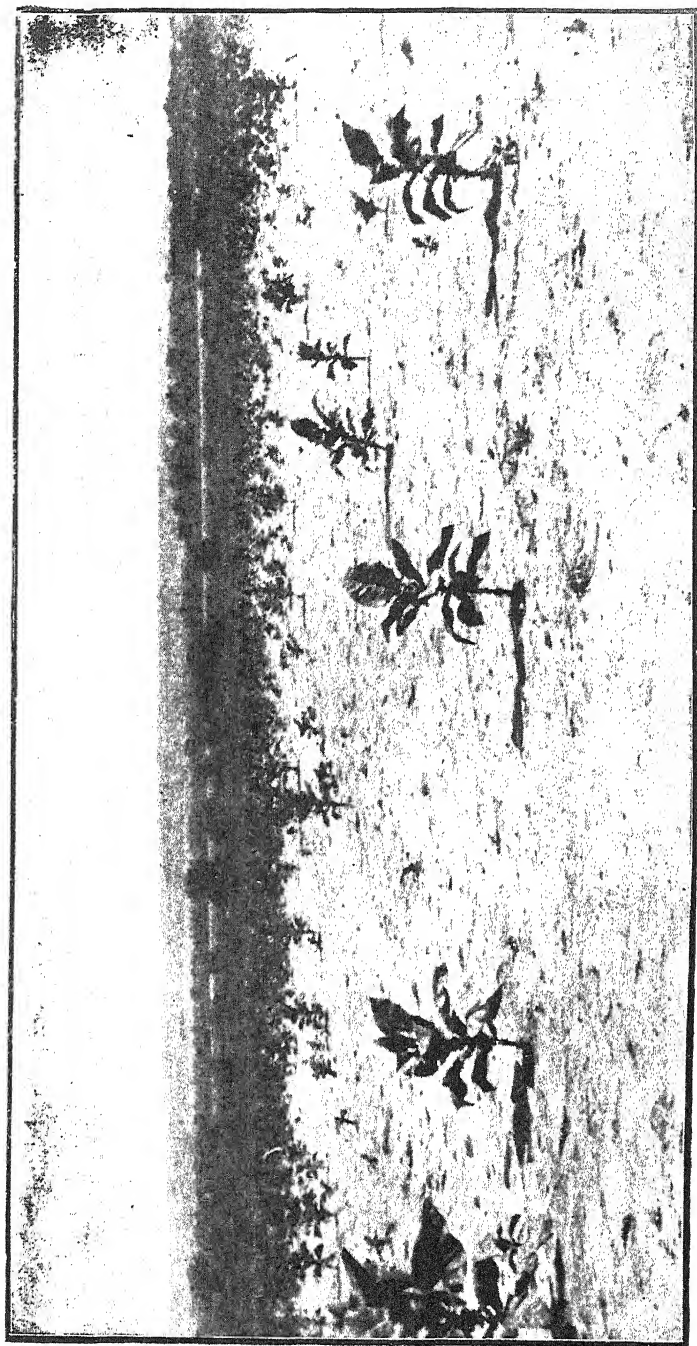


PLATE I.



Field of tobacco injured by tobacco miner.



PLATE III.

The great preventive measure in the field in other countries is usually given as *clean cultivation*, especially as applied to keeping down the weeds during the time the crop is off the ground. In this Territory, however, the dryness of the winter usually ensures the absence of succulent vegetation from most tobacco lands between the months of May and November, except it be volunteer tobacco plants growing out from the ploughed-in stalks. These should always be destroyed, both on account of cutworms and tobacco mimers, which will be dealt with later. Sometimes, however, naturally moist soil is used to secure an early planting, and if such a course is intended, care should be taken to keep the ground free from weeds during the winter, or the loss from cutworms may be considerable. The planter should always bear in mind that cutworm moths are on the wing in September, looking for succulent plants amongst which to deposit their eggs, and that if the cutworms hatch and enter the ground, subsequent ploughing will destroy the available food, but not the cutworms themselves to any great extent, and that the tobacco plants when placed on the ground come as a welcome supply of nourishment to the hungry insects.

The land may, of course, be baited for cutworms, as already described, before planting out, or a spoonful of the bran or meal bait may be placed by each plant as a safeguard.

Remedies.—When cutworms are abundant in a tobacco seed bed full of plants, they are not by any means as easily destroyed as they are before the plants come up. There is an immense supply of succulent food everywhere, and though the bait be distributed through the bed, its attractiveness does not extend probably beyond a few inches; hence the value of preventive measures. To get the best effect it will probably be best to make up a bran or meal bait of arsenate of lead or Paris green, so as not to injure the plants, and distribute this abundantly through the bed, so that as many cutworms as possible will come into the sphere of its attractiveness. Arsenite of soda, being a soluble form of arsenic, is injurious to vegetation with which it comes into contact. This is about all that can be done if the cutworms are very small and attacking the young seedlings. Larger cutworms can usually be found quite easily by digging in the surface of the soil near a newly severed plant. Natives usually have something in the nature

of a special aptitude for this kind of work, and a few good "boys" are capable of ridding a considerable quantity of seed bed of cutworms in a short space of time, and of rendering the use of insecticides unnecessary. Each half-grown cutworm destroyed may be reckoned as a score or more of plants saved.

In the field cutworms may be destroyed by hand as above, but here the plants are very much wider apart than in the seed beds, and the distribution of poisoned bait after the damage has commenced is of considerable value and should be practised.

THE TOBACCO MINER (*Phthorimæa operculella*).

The little moth shewn at fig. 1 in the adjoining plate is a serious pest of tobacco in this Territory, and, according to report, in the Transvaal. It is also injurious in certain parts of the United States, where it goes under the name of "split-worm," owing to its habit of mining between the layers of the leaves, forming vacant patches between the upper and lower skins. In addition to tobacco, this insect is the most serious enemy of potatoes in South Africa, attacking and destroying the tubers. As a potato pest it goes under the name of the "potato tuber moth."

In the plate the insect in its three stages is shewn somewhat enlarged, the actual size being indicated by a line drawn adjacent to the figure. The female moth lays her tiny whitish eggs singly on the lower part of the leaf or stem of the tobacco plant. The young larvæ hatch out in about seven days, and eat their way into the tissue of the plant. The duration of the caterpillar stage has not yet been followed in the tobacco plant in Rhodesia, but in the potato tuber it may be passed in as little as nineteen days, and probably this period would not be much exceeded under favourable conditions in the tobacco plant. When full fed, the larva changes to a pupa, or chrysalis, usually inside the plant, spinning a cocoon for this purpose. The head of the pupa as a rule faces a specially prepared exit hole. The pupal period lasts about fifteen days. The moths fly abroad at their own volition only at night, but may be kicked up from the plants abundantly during the day. Their flight under these circumstances is short and swift, and they immediately seek another resting place.

The damage done by the caterpillar varies in accordance with the portion of the plant attacked. The mining in the leaves is generally confined to the lower leaves of the plant, many of which are removed in the ordinary way when pruning is carried out, but many useful leaves are also affected. In the barn, when the temperature becomes uncomfortably hot, the caterpillars may often be seen in large numbers hanging by threads from the leaves, and crawling rapidly over the floor in their endeavours to escape the heat.

Were it only the leaves of the plant that suffered attack, the insect would be considered as one of the minor pests; it is the injury done to the stems that raises it to first-class importance. When the caterpillar penetrates the stem of a very young plant, a swelling is formed, as shewn in fig. 5a in the plate. This swelling so interferes with the vital functions of the plant that growth is arrested above it, and the plant endeavours to rectify matters by sending out side shoots below the swelling, and, if unaided, produces very little leaf fit for reaping. Stem injury is exceedingly common in the seed beds, and infested plants should be carefully avoided when transplanting.

Preventive Measures.—There are several measures which should be employed to avoid serious loss from this pest. One weak point in the life history is that the insect requires to continue breeding in the winter months, *i.e.*, it does not pass this period in the ordinary way in any one of its stages, though possibly some of the adult moths may be able to live for a few months in sheltered situations. During the winter, therefore, the grower's efforts should be directed towards removing the food supply of the insect. One fruitful breeding place is formed by the volunteer plants that commonly spring up from the stalks of the tobacco when these are ploughed into the ground. These volunteer plants should be cut down and left to wilt and wither in the sun. The insect also breeds in the leaves of certain wild solanaceous plants—that is, plants belonging to the same family as the tobacco and potato. Amongst these may be mentioned the “stinkblaar” or “thorn-apple” (*Daturum stramonium*), which is a common weed in certain parts of Matabeleland. This weed should not be tolerated near tobacco lands. I have not yet observed the insect breeding in any wild plant in Mashonaland, but prob-

ably such host plants are to be found. Finally, the association between the pest and the potato must not be overlooked. A store of potato tubers breeding the moths abundantly is a source of infection and danger to neighbouring tobacco. Besides tunnelling the potato tubers, the miner also mines the leaves and stems of the potato as it does those of tobacco. A field of early potatoes in a moist vlei, say in August and September, gives the insect a chance of increase, which may have its effect on neighbouring seed beds of tobacco in October. It is as well, therefore, to plant early potatoes as far as possible from the site of the seed beds, since from comparative observations the insect seems to prefer the foliage of tobacco to that of the potato.

A well-known tobacco planter reports good results in the way of protecting his seed beds by attention to the coverings as recommended in connection with cutworms. When hardening off, the covers were carefully returned every evening and removed again in the morning, and the result was stated to be a great lessening in the number of infested seedlings. The writer has himself seen tobacco beds perfectly free from split-worm, careful attention being paid to the replacement of the covers each night, whilst volunteer plants in the open were much infested. The brickwork needs to be well joined and the covers sound to keep out the moths, which have a remarkable capacity for insinuating themselves through crevices in search of food on which to deposit their eggs.

Remedies.—Plants in the field that shew the characteristic stunted growth and side shoots may be severed below the swelling, and all but the strongest shoot removed. Such plants, if young, will grow out and make leaf fit for reaping, though not equal to that of plants that have received no check.

The caterpillars have a habit of leaving old mines and starting new ones, and, as already mentioned, the eggs are laid on the surface of the plant, so that the young have to eat their way into the tissues. A thorough spraying with arsenate of lead—1lb. to 15 gallons of water—or of

Paris green...	1 lb.
Lime ...	2 lbs.
Water ...	160 galls.

should, therefore, destroy many of the caterpillars in making their way through the skin. This might be useful in the seed beds. In America they have a method of sending through the plantations labourers who crush the caterpillars between the finger and thumb inside the leaves, and this is said to be done very quickly and to have a very beneficial effect. In this country, where labour is cheap, this method might be useful, as natives are not slow at this kind of work. It must, however, be remembered that the insect is at its worst as a leaf miner when it attacks leaves intended for use as cigar wrappers. In Rhodesia its leaf-mining habits are of less moment than its practice of boring the stems, in which situation destruction by hand is not possible.

SUMMARY.

To avoid cutworm attack—

- (1) Burn over all seed beds thoroughly before sowing.
- (2) Clear and distribute poisoned bait over the ground for 30 yards around the seed beds before the plants are up.
- (3) Keep the moths from laying eggs in the seed beds by making the brickwork sound, keeping the covers in repair and adjusting the covers carefully each evening.
- (4) If necessary, bait the land before planting out or place a little bait by each plant.

To remedy cutworm attack—

- (1) Put "boys" to hunt and destroy the cutworms near newly severed plants each morning. This is only efficacious when the cutworms are fairly large.
- (2) Distribute poisoned bran or meal bait made with Paris green or lead arsenate plentifully through the infested beds.
- (3) Put poisoned bait about infested lands.

To avoid tobacco miner attack—

- (1) Keep the moths from laying eggs on the plants in the seed beds by making the brickwork sound, keeping the covers in repair and adjusting the covers carefully each evening.
- (2) Choose seedlings for planting out that are free from stem swellings and mined leaves.

- (3) Destroy all volunteer tobacco plants about the lands during the winter, and also the "stinkblaar" weed (*Datura stramonium*).

To remedy tobacco miner attack—

- (1) Cut off plants shewing stunted growth and side shoots below the swelling in stem, and remove all side shoots except the strongest.
- (2) Probably a thorough spraying with an arsenical spray will destroy a large number of the miners when making fresh mines.

EXPLANATION OF PLATES.

PLATE I.

- Fig. 1. Tobacco miner (*Phthorimaea operculella*)—Adult moth. Slightly enlarged.
 Fig. 2. Tobacco miner—Pupæ. Slightly enlarged.
 Fig. 3. Tobacco miner—Larva from above. Slightly enlarged.
 Fig. 4. Tobacco miner—Larva from side. Slightly enlarged.

The actual size of the above is indicated by the lines adjacent to the figures.

- Fig. 5. Tobacco plant shewing swelling on stem due to attack of tobacco miner on young plant.
 Fig. 5a. Swelling on stem as above. Plant refuses to grow out above this point.
 Fig. 6. Cutworm moth (*Agrotis segetis*). Life size.
 Fig. 7. Cutworm (*A. segetis*) from above. Life size.
 Fig. 8. Cutworm (*A. segetis*) from side. Life size.
 Fig. 9. Cutworm (*A. segetis*) half grown. Life size.
 Fig. 10. Moth of "greasy cutworm" (*Agrotis ypsilon*).

PLATE II.

Field of tobacco shewing big gaps and also dwarfed plants due to attack of tobacco miner (*Phthorimaea operculella*).

PLATE III.

Tobacco leaves mined by *P. operculella*. (a, a) Caterpillars in the leaf tissue.

Sumatra Tobacco.

HINTS TO RHODESIAN GROWERS.

By C. J. SKETCHLEY.

In view of Sumatra tobacco being grown this season by quite a number of farmers, a few notes on the subject from one who has grown this variety largely for over fourteen years in tropical countries, may be of interest.

Sumatra leaf tobacco is grown and used almost exclusively for the outer wrapper of cigars. It should be of a fine silky texture, very thin, tough, and elastic, and it must be essentially of good burning quality; shewing a white ash, burning evenly round the cigar, and it should hang on tenaciously until shaken off by the smoker.

Good Sumatra tobacco has little or no flavour, although in some countries it develops a flavour peculiarly its own, and is then used for blending purposes, as well as for wrappers. I have known cigars made from a blend of Sumatra, Cuban, and Zimmer Spanish tobaccos, with Sumatra wrappers, all grown on the same plantation, to fetch a high price on the London market. The reason for the great demand for Sumatra leaf for wrappers is, that while Havana leaves will only go from 40 to 60 to the lb. weight, Sumatra will give from 120 to 140 to the lb.; and, as each leaf of from 12 to 14 inches long will cut from 8 to 10 wrappers, it will be understood that for this purpose Sumatra tobacco is more economical than other tobaccos (although costing from 4/6 to 8/- and 10/- per lb.), whose burning qualities are not so good, whose texture is coarser and lacking altogether the elegant finish of the Sumatra covered cigar.

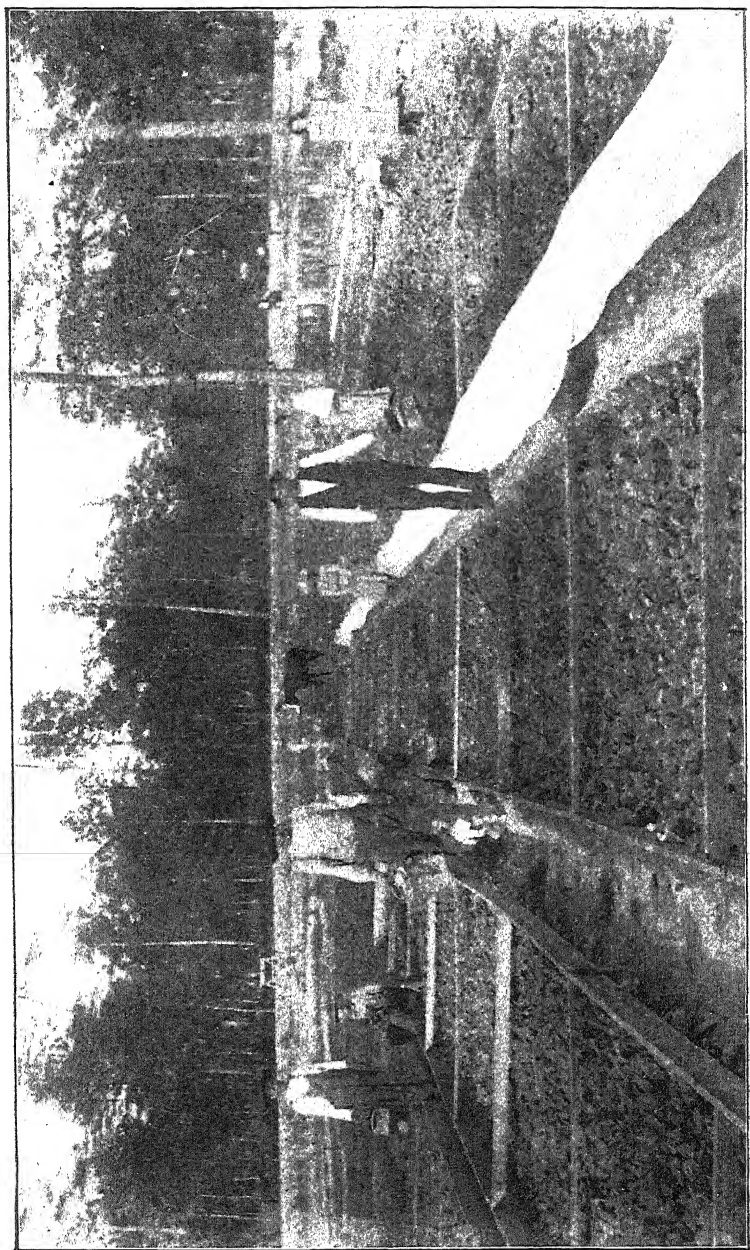
The origin of Sumatra tobacco is unknown, though it is stated that it is indigenous to Sumatra, and has been used by the natives there for ages. This is instructive, as it is always

supposed that all tobaccos came from the American continent originally. It is said that the small leaved Turkish tobacco was originally Maryland tobacco, which, from climatic causes and conditions, has assumed a type unlike any other tobacco. It is curious how tobacco introduced into a new country will assume in a few years a distinct type of leaf and aroma; in many cases quite distinct from the parent plant. I have proved by my own experience that Sumatra tobacco grown under tropical conditions several years in succession, from seed saved locally, has deteriorated in a remarkable manner as wrapper leaf, although it has improved in aroma and texture as a filler tobacco. Therefore, if the object was to produce first class wrapper leaf of an even quality, from year to year, it was found necessary to import the seed direct from Sumatra each year. It is quite feasible that, by selecting the best plants, and collecting the seed for a few years, a distinct type of Sumatra tobacco might be grown here, which would be very useful to cigar makers, if not of the finest type for wrappers.

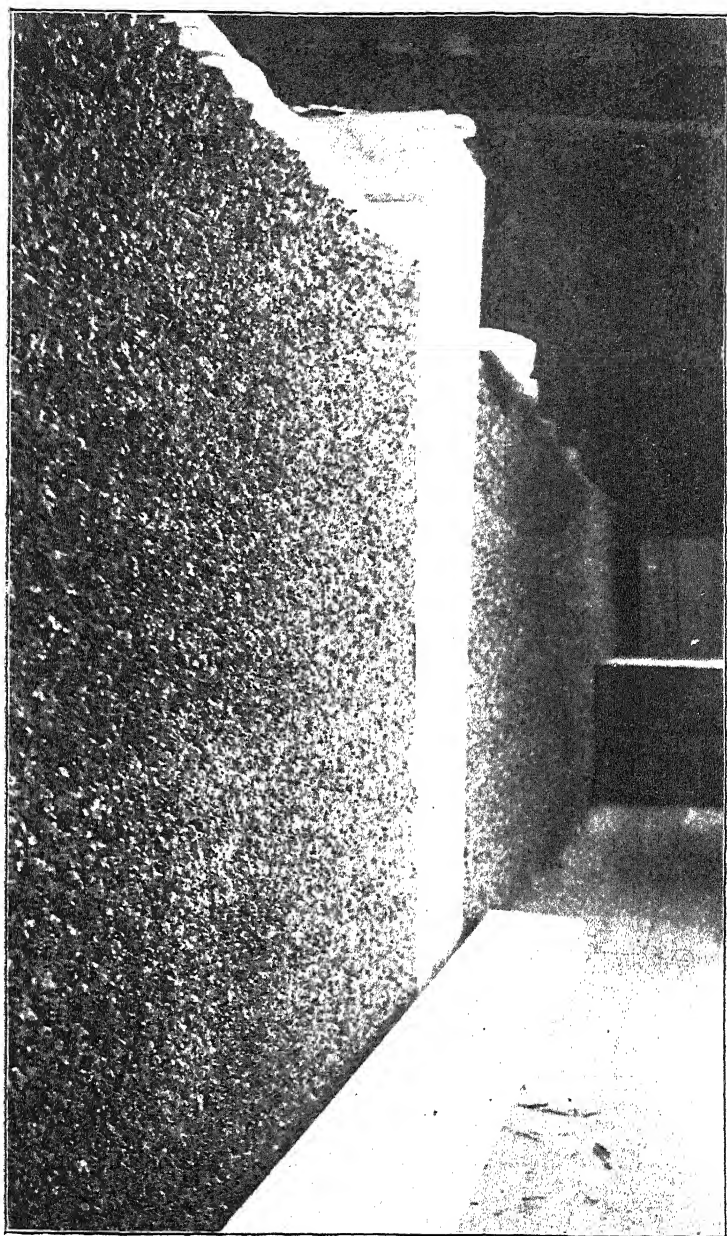
I am inclined to believe that a finer tobacco could be grown here for wrappers from Sumatra seed than the Connecticut seed leaf, which is so largely grown for the purpose in America. But all these problems require to be solved, and this is, in my opinion, the work of the Government Experimental Farm. There are few men here who have any knowledge of cigar tobacco growing, and experiments by others are costly and unsatisfactory. My experience here for the last nine years is that Sumatra tobacco leaf thickens, and becomes very similar to the Java type. Java tobacco was first introduced from Sumatra, and although it fetches a much lower price in the markets than Sumatra, it is in fair demand for cigar fillers, and pays well to grow. I think it likely that Sumatra grown here will develop into this type.

It is quite possible that a high class fine leaf could be grown here on the system adopted in Florida and Cuba—that is, to cover the whole plantation with a framework of sawn timber or poles, covered with limbo or canvas, which has proved such a success in those countries; but it is needless to say the cost in Rhodesia would be prohibitive.

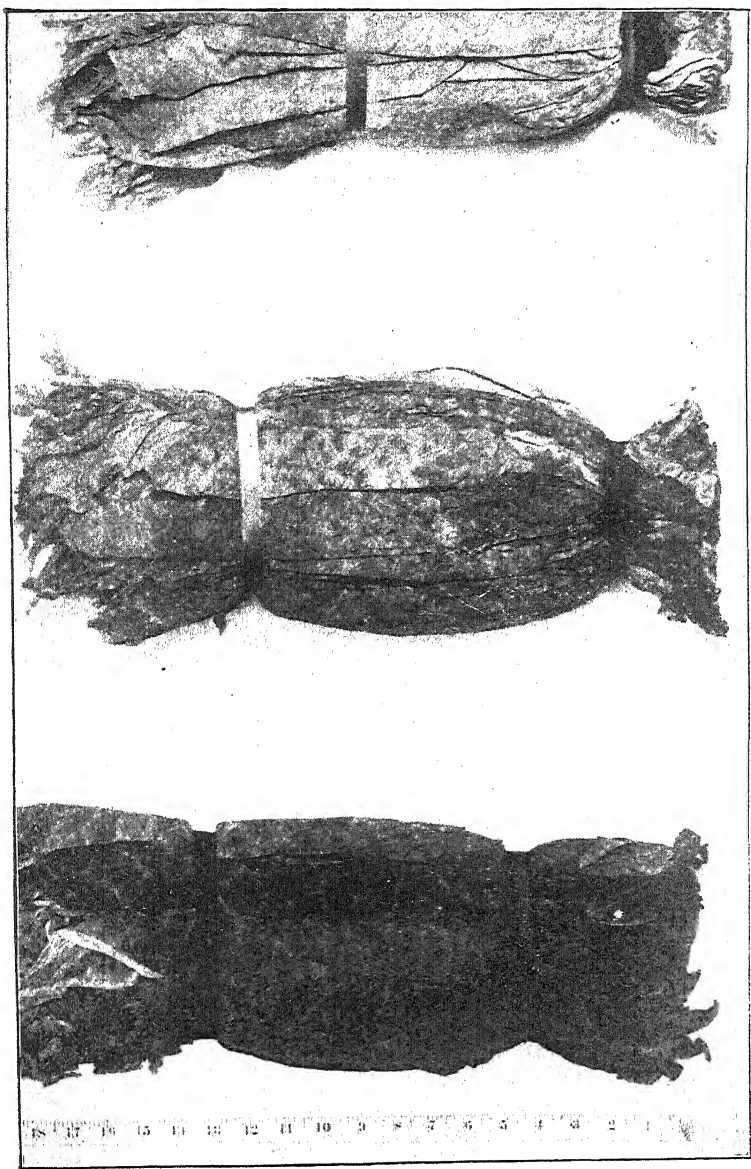
Sumatra tobacco loves a hot, moist climate and a rich leaf mould. Under favourable conditions it is a rapid grower. I



Tobacco seed beds in Texas,



A large fermentation pile, Ohio.



Dark mahogany, light mahogany and lemon wrappers.

have made seed-beds on the banks of tropical rivers, in rich sandy soil, with a temperature during the day of 80 degrees to 86 degrees F., and at night 76 degrees to 80 degrees F. Three weeks from sowing the seed, the plants were 5 inches high, and ready to plant out. Two months later the crop was ready to harvest, the plants being 6 ft. high, with an average of 18 to 22 leaves to a plant.

To grow a fine leaf, the plants must continue growing without a check—the more rapid the growth, the finer the texture of the leaf. One drawback here is that, as soon as the rains commence, the temperature falls. To attempt to grow a fine, delicate leaf during the hot dry spell before the rains, even under irrigation, would, I am afraid, be hopeless, as the production of a fine leaf depends chiefly on heat and a moist atmosphere.

I am now experimenting with seed kindly sent me by the Agricultural Department. I have enough plants to grow about two acres. One acre I shall "Safco" heavily; the other I shall leave to natural conditions. I shall plant on the richest soil I have on the river banks.

My method of growing Sumatra is as follows:—I first procure the best and purest seed I can obtain, preferably direct from Sumatra. To prepare the seed beds, I dig over the land and well burn it. Mealie stalks do very well, and should be piled 3 feet high, covering the whole of the land required. I then hoe in the ash, and rake it over evenly; I dress the land with a good application of "Safco," or other good fertiliser, and rake it in. I then lay out the beds 4 feet wide by 40 feet long, rake evenly and pat down the surface with a spade, hoe, or roll it. I then water it thoroughly, so that it is wet down 6 inches or so. Early the following morning, before the wind rises, I mix one dessertspoonful (not heaped up) of seed with an ordinary wash basinful of sifted wood ashes. These I mix thoroughly by passing several times through a sieve. I then sow evenly by sprinkling it broad-cast, going down the bed one way, and up the other, to ensure even distribution, for which the white ash is a good guide. I then roll or pat the surface firmly with spades, and cover it evenly with long dry grass about half an inch thick (care must be taken that the seed ends of the grass be cut off, or you will be raising a fine

crop of grass with your plants). Water well over the grass two or three times a day. In five to eight days the seed will germinate, and as soon as it is seen through the soil cover it with limbo, or, as I prefer, make a framework of sticks about 12 or 16 ins. high round the beds, and lift the grass on to the framework, to shade the young plants from the hot sun. The beds should now be watered three times a day—in fact, they should never be allowed to get dry. If any check occurs, a tablespoonful of ammonia sulphate in each 3 gal. watering can, applied every two or three days, will soon make a difference, and the plants which look sickly will assume a healthy dark green. If cut worms or other leaf eating pests give trouble, an application of arsenate of lead sprayed over the plants will at once rectify this trouble.

The plants should be big enough in four to six weeks to set out, and they should then be from 5 to 6 inches high. I may say here that it is a great mistake to put out plants when too small. A big strong healthy plant can stand a dry spell after planting, whereas a small undersized plant will simply be dried out. The land cannot be too well prepared by ploughing and cultivating. Ridging is now the fashion, but in any case the plants should be set in rows 3 feet apart, and 2 feet to 2 feet 6 inches apart in the rows. An application of a teaspoonful of "Safco" should be applied round each plant, or if ridged, it can be sown with an ordinary one-row mealie planter on the ridges. Constant cultivation is necessary, until the plants are 2 feet high, when all the labour should be hand work. The plants should be constantly watched for cut worms, caterpillars and other pests, as a leaf with holes is useless for wrappers. Suckering and topping must be done as with ordinary Virginia tobacco, but the topping should be left until the crop is a uniform height, say 5 to 6 feet, although perhaps $4\frac{1}{2}$ to 5 feet will be the maximum height here in most cases.

After topping, the plant rapidly matures, and should be harvested either by the single leaf system, or by reaping the whole plant. It is usual to leave from 16 to 22 leaves on each plant. If the whole plant is cut, it should be hung in the barn on sticks or wires, and the whole mass in each tier should be pushed close together, and left so for two or three days to yellow. It must then be spread apart for the air to circulate

amongst the tobacco to dry it out. If the weather is too moist, or a rainy spell sets in, the tobacco is liable to get what is called "pole burn," a mould which forms on the leaf, but if small fires 10 or 12 feet apart are made under the tobacco, it will soon disappear. This can be prevented by a timely application of the fires, which need consist only of five or six small sticks each.

The leaves can be stripped as they ripen on the plant, by the leaf system. The leaves are then placed on the ground on dried grass, in layers about 10 to 12 inches high, and covered again with grass, for two or three days, when they can be tied in bundles and hung in the barn to dry. When the mid rib is thoroughly dry and crisp, the tobacco is ready to strip and sort. Leaves of 10, 12, 14, 16 and 18 inches each should be kept separately. They should then be graded, each length being sorted into three shades, viz., light, medium, and dark, each shade being kept together. They can then be stacked in bulk to ferment, and here the art of the experienced grower comes in. If bulked too moist, too high a fermentation will set in; and if the tobacco is not moist enough, it will perhaps not ferment at all. A piece of the floor is marked off for the stack, which should be from 8 feet to 12 feet wide, and of any length. A number of logs are laid on the ground, and these are crossed by smaller sticks, which are covered a foot or so with sweet dried grass. If the grass is covered with a wagon sail, all the better. The tobacco is tied in bunches (hands) of 12 or 14 leaves with a piece of "tamba" or twine, and then laid in rows on the sail, butts out, in two rows, the tips of the leaves just crossing or overlapping. The next two rows are then placed in position, butts to butts, and so on until the first layer is laid the whole width of the stack. The next layer must be laid from side to side in the same manner, but crosswise, the bunches pointing from end to end of the stack, and so on, reversing each layer until the stack is complete. The larger the stack, the better the tobacco will be, if in proper condition, up to 10 tons. It will be necessary to place a thermometer in the stack every 3 or 4 yards, about half-way up the stack from the bottom, in a hollow bamboo, or a long box made of laths. The thermometer can be pushed in with a stick, and can be drawn out by a string tied to it. The stack should be covered with a wagon sail; in tropical countries rush mats are used. If

the temperature should rise above 120 degrees F., re-stack the tobacco on an adjoining site, in the same way as before, when the top layers will be at bottom and bottom at top, ensuring an equal fermentation. If the stack does not rise above 120 degrees, then let it stand until it cools down to the outside temperature, when it is ready to bale and ship.

When shipping tobacco to England, I have found it better to handle it in this manner, and ship it direct to tobacco "handlers," who re-sort the leaf into the proper number of shades and grades, re-bale it, and prepare it for the auction sales. In no case have I paid more than $\frac{3}{4}$ d. per lb. for this work.

To attempt to sort the leaves into the requisite number of shades, as is done in Sumatra by expert Chinamen, with the labour we have at command here, would be simply hopeless, as something like sixteen shades and grades are required. About sixteen years ago, there was a craze for a dark olive green tint. This was obtained by harvesting the tobacco about two weeks before it was ripe, but the most desirable colour is a bright cinnamon brown, as all leaf darkens more or less when damped for wrapping cigars. Some of the drying sheds used in Sumatra are enormous structures, 150 feet by 150 feet being an ordinary size, and always built of poles and grass. Some of the companies growing tobacco there have a capital of £250,000 to £350,000, and pay dividends as high as 75 per cent. I should be very pleased to see Sumatra tobacco a success in this country. We have made both Virginia and Turkish tobaccos a decided success, and why not Sumatra, even if it is not of the highest grades, which would be expecting too much.

In closing, I would impress upon all farmers who are trying Sumatra this year, to remember three things:—

- (1) Keep the plants growing as rapidly as possible from sowing the seed to harvesting.
- (2) Don't allow a grub or insect pest to injure a leaf.
- (3) Use great care in cultivating the crop while growing, during harvesting operations, and when handling the leaf at all times, as broken and worm-eaten leaves are useless for cigar wrappers.

Notes on Cattle Breeding.

PART I.

By R. C. SIMMONS.

THE CLASS OF CATTLE BREEDING TO BE PURSUED.

It is almost always a sound rule in farming to devote one's energies to the production of those crops or breeds of animals for which the land is best suited. Exceptions to this rule occur sometimes near large consuming centres, in which cases the market often warrants abnormal expenditure on production. Generally speaking, the rule holds good for the stock farmer in Rhodesia.

Taking, then, the quality, nature, and situation of one's land and the climatic conditions of one's district as a guide in deciding on a plan of action, the prospective stock-breeder will find that his land comes under one of three main headings, namely, ranching or beef land; dairying or stud breeding land; or general purpose land.

For instance, a property of, say, 10,000 morgen or over situated in the Umvukwe Hills, twenty-five miles or so from the nearest railway, obviously points to beef production as the main object to be followed. A property of 1,500 or 3,000 morgen within ten miles of the railway, and of which 10 per cent. or 20 per cent. is ploughable, suggests a profitable milk business or stud stock breeding. Again, some properties in Victoria and similar districts, combining arable land with an extent of grazing area, admit of both milk and meat production being profitably carried on.

THE BREED OF CATTLE TO ADOPT.

Having decided on the class of breeding one is going to pursue, the next important step is to decide on the breed of

cattle that will meet one's requirements. This is a question which demands very careful consideration, and one which, in our present state of knowledge of this country, admits of many opinions. The question is really : what breed of cattle should be adopted for use in grading up local cattle towards a European standard. It is seldom that any European breed is seen here quite pure except for stud purposes, and, in some instances, dairying ; but, whatever the system to be followed, the breeds must first be considered on their merits as pure-bred animals. It is hoped to deal with the subject of grading in another issue. The writer is inclined to think that the diversity of opinion with regard to the various breeds arises from the difference in the quality of the land on which the several herds of any one breed have been placed, rather than from any great tendency to variation in the qualities of animals of any one breed.

It is essential to examine carefully the nature of one's land and the climatic conditions of the district before making a final decision as to a course of action. It is a matter of common knowledge that both soils and climatic conditions in Rhodesia vary considerably within very short distances, and consequently a breed of cattle may behave quite differently on farms within a mile or two of each other.

Taking the foregoing facts into consideration, it may be broadly stated that the most suitable animals for beef production are to be found amongst the Shorthorn (beef type), Sussex, Hereford, North Devon, Aberdeen Angus and Africander breeds ; for dairy purposes amongst the Shorthorn (milk type), Lincoln Red, Friesland, South Devon, Jersey or Ayrshire breeds : and for general purposes amongst the Shorthorn, North and South Devon and Red Polled. This list by no means exhausts all the available breeds, but it is highly probable that one breed or other of those mentioned will suit the varying conditions obtaining in Rhodesia.

THE SHORTHORN AND RED LINCOLN SHORTHORN.

A certain amount of misunderstanding exists as to the difference between the Coates Shorthorn and the Lincoln Red Shorthorn, and for the benefit of those who are not quite clear on the subject it will perhaps be well to explain.

The Coates Shorthorn is the Shorthorn proper: it is either red, white, red and white, cream or roan in colour, and is so called because the herd book of the breed was originated by one Mr. George Coates in 1846, and it has been called after him "Coates Shorthorn Herd Book." Coates Shorthorns may be either of milk or beef strains.

The Lincoln Red Shorthorn is invariably of a rich dark red colour, and the breed was formed by crossing a local Lincolnshire breed with the improved Shorthorns of the northern counties, the first cross taking place late in the eighteenth century. These cattle were subsequently developed more particularly for their milking qualities. A separate herd book was started for them in 1895, and they were given separate classes on the Royal Show for the first time in 1901.

CHOICE OF A BEEF BREED.

We have stated that the choice of a beef breed lies between Shorthorn (beef type), Sussex, Hereford, North Devon, Aberdeen Angus and Africander, all of which vary in size, quality of meat, hardiness, early maturity, suitability for mating with local cattle, and so on. It will, therefore, be necessary to consider them briefly breed by breed.

THE SHORTHORN.

Either as milk or beef producers, this breed has been brought to a very high degree of excellence; and, since the qualities for which it is chiefly noted—namely, early maturity, weight and excellence of carcase, heavy milk production, and so on—can only be produced in a genial climate and by a liberal supply of food, it follows that, although the breed is one of the best in the world, it is not altogether the hardiest. In Rhodesia the Shorthorn or its grade progeny appears suited to the better soils and more sheltered positions, and it is noticeable that it responds rapidly to an improved system of farming, whether for beef or milk production. The breed has been bred carefully and true for a length of time, and is consequently known throughout the civilised stock breeding world as an excellent breed for the purpose of grading up inferior cattle.

In considering the breed from a beef point of view, it will be necessary, in order to understand which families or strains

are noted for their beef qualities, to make a brief study of its origin and development. For upwards of 150 years the Shorthorn has been bred on two distinct lines, namely, for beef or for milk. This does not mean that beef Shorthorns are all poor milkers; on the contrary, many are quite good performers at the pail. Similarly, animals of milking strain produce many excellent butchers' carcasses. In the breeding of the beef Shorthorn, the butchers' and graziers' requirements have been practically the sole aim. Consequently these qualities are extremely likely to be reproduced in the progeny of such animals, whereas the milking quality, having been a secondary consideration, tends to be inferior in the progeny, and, if breeding on beef lines were strictly adhered to, it is probable that in a few generations the beef Shorthorn would be regarded as a very poor milker indeed.

In the breeding of the milk type of Shorthorn, exactly the opposite holds good. There are few works more instructive and interesting to the stock breeder than books such as "The History of Shorthorn Cattle" (Vinton & Co.); "The History of Killerby, Studly and Warlaby Shorthorns" (Ridgway); or "Thomas Bates and the Kirklevington Shorthorns" (Redpath, Newcastle). To those who have not time or inclination to study these volumes, some extracts from them may be of service.

BRIEF HISTORY OF THE BREED.

The first notable improvers of the Shorthorn were the brothers Charles and Robert Collings, who began farming at Ketton, near Darlington, about the year 1772. Following the system of breeding instituted by Bakewell, with whom they were acquainted, they improved their herds at Kelton and Barmpton, near by, to an enormous extent. At the dispersion sale at Ketton in 1810 the bull "Comet" fetched the then record price of 1,000 guineas, whereas Mr. Charles Collings's first notable bull "Hubback" was bought for 8 guineas. The Barmpton herd, belonging to Mr. Robert Collings, was dispersed in 1820.

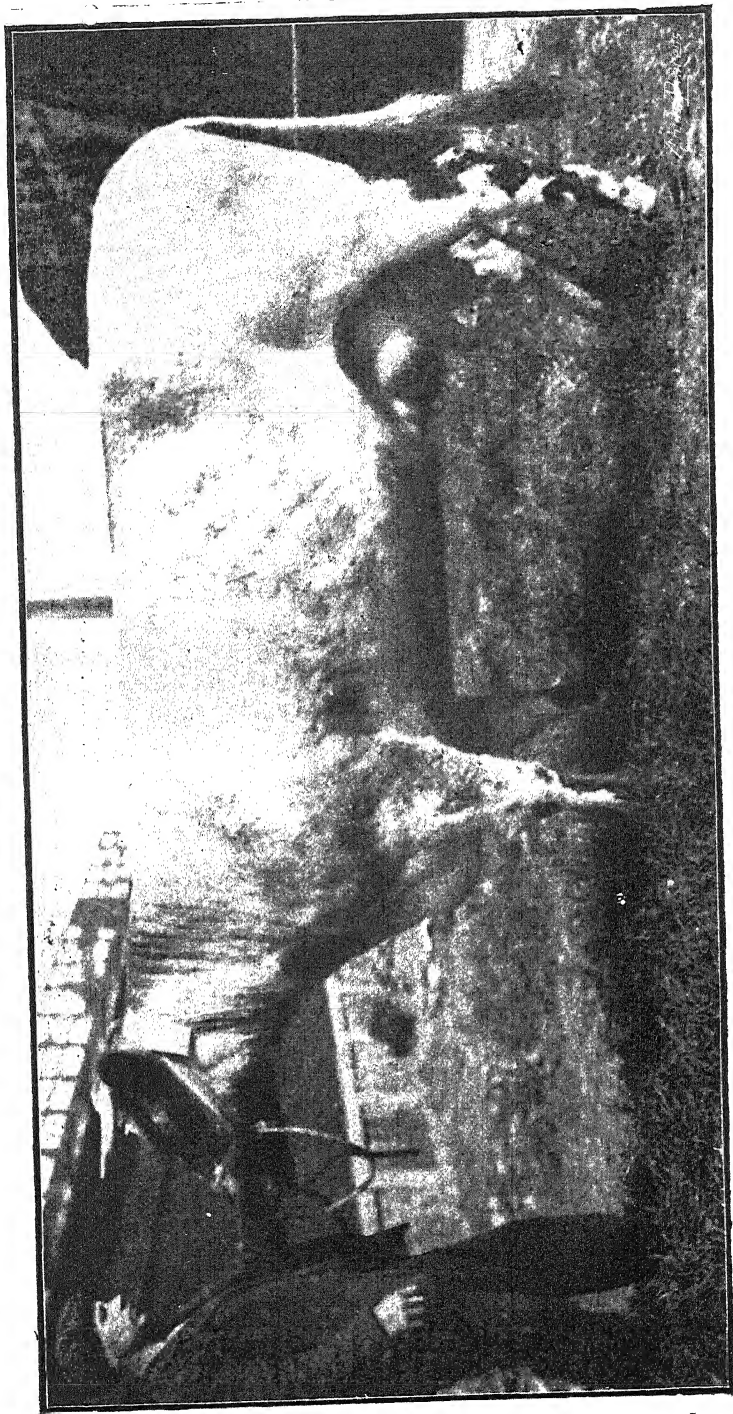
After the brothers Collings had retired from the field, the work of improving the Shorthorn fell chiefly into the hands of Mr. Thomas Booth and members of his family, and of Mr.



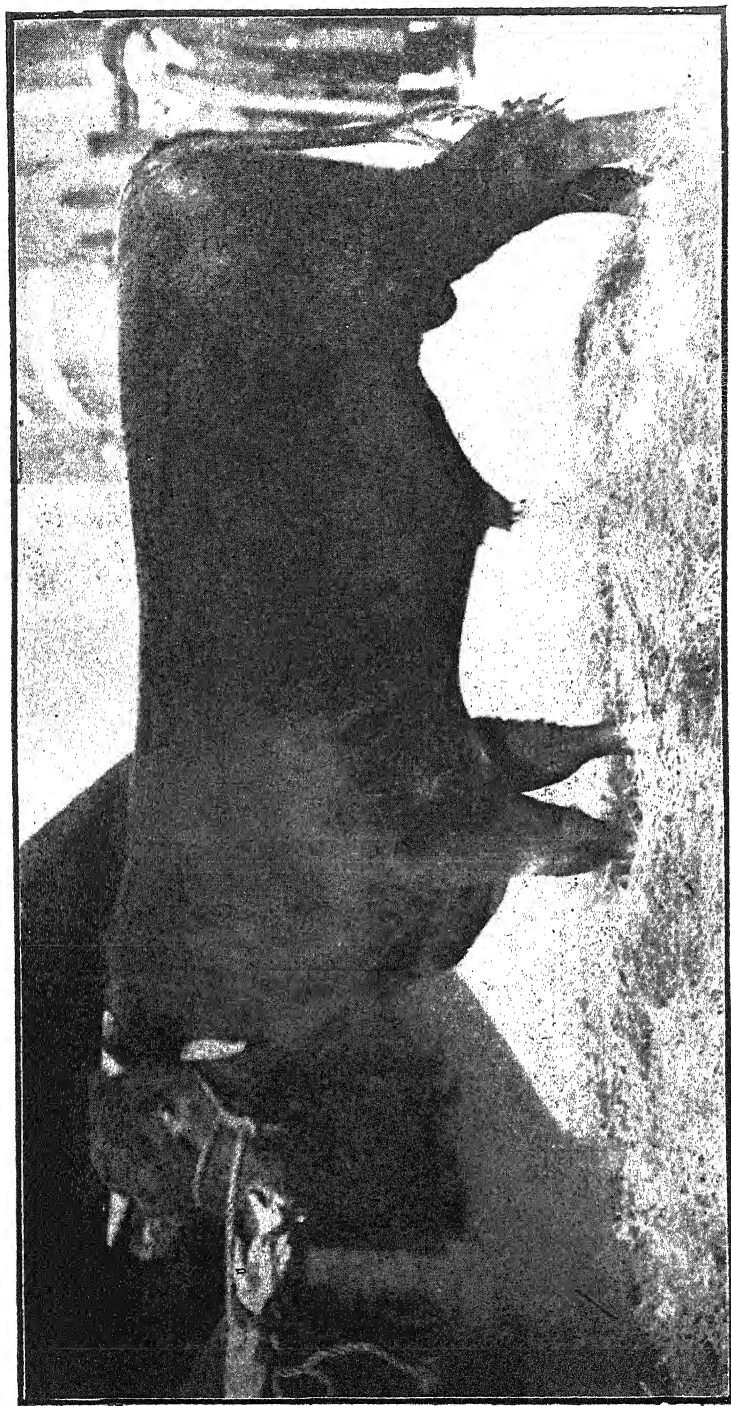
"BARON RICHARD."—A Shorthorn beef bull. Bred by the Duke of Northumberland. An example of two Scotch crosses on Booth blood.



“VERBENA.”—A type of Shorthorn beef heifer. Bred by Lord Sherborne. The property of the B.S.A. Co., at Rhodesdale.
An example of three Scotch crosses on Booth and Bates blood mixed.



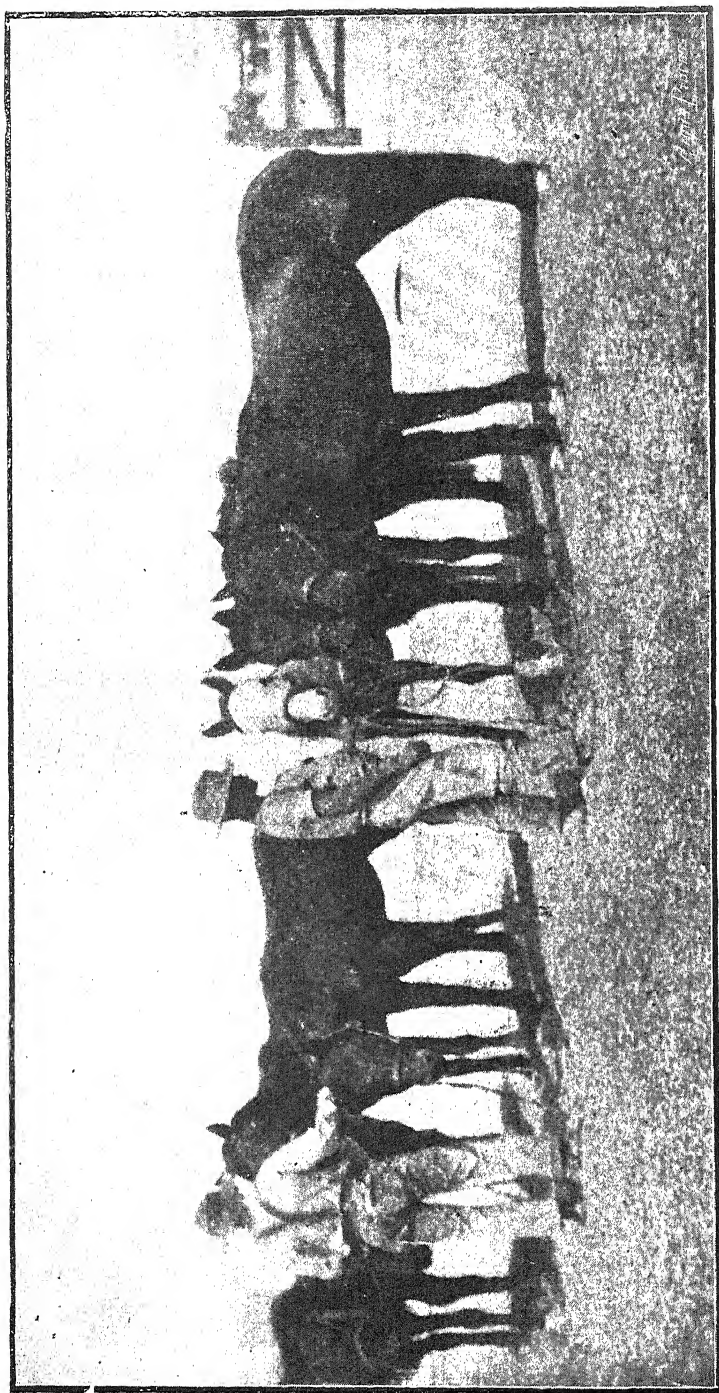
"FRANTIC."—A Shorthorn dairy cow. Bred by Mr. Geo. Taylor, of Cranford, England. The property of the B.S.A. Co., at Rhodesdale. A pure Bates cow.



“COWLEY KIRKMAPLE.”—A Shorthorn dairy bull. Bred by Mr. J. Horlick, Cowley Manor, (Sheltenham. The property of the B.S.A. Co., at Rhodesdale. An example of one Scotch cross (to give constitution) on pure Bates blood.



“HAMILTON DAISY 14th.”—A Shorthorn dairy type. The property of the B.S.A. Co., at Rhododale. A pure Bates cow. Holds the certificate of merit at the London Dairy Show. Gave 760 gallons of milk with her last calf.



A group of brood mares, recently imported from the Free State by Messrs. T. Pretorius & Co., to be placed on the farm Ngutu, 16 miles north of Salisbury, with a half-bred stallion purchased locally.

Thomas Bates. These two gentlemen were contemporaries of the brothers Collings, and the bulk of both their herds was derived from cattle bought from Charles and Robert Collings, or were of direct descent from animals bred by them. Mr. Thomas Booth was the founder of what are now spoken of as "Booth Shorthorns"—that is, cattle of essentially beef qualities, and whose pedigrees extend back principally to the cattle bred by Mr. Thomas Booth and his sons, Richard and John Booth, on the farms of Killerby, Warlaby and Studly, in the early part of the nineteenth century. Mr. Thomas Bates lived at Kirklevington, and developed his herd on milking lines principally. He founded what is now known as the "Bates" or milking type of Shorthorn, all tracing back to animals bred by him at Kirklevington.

The essential difference between the Booth and the Bates cattle was that, while the Booth cattle were bred with the object of producing a thick, heavy, early maturing beef animal, Mr. Bates aimed at producing firstly a heavy milker, and secondly a good carcase. Both these strains possessed and still possess a style and gaiety of carriage which is absent in the present day Scotch Shorthorn, but the Bates animals possess the quality in a more marked degree. The Bates and Booth strains were carried on almost pure until the early seventies, when constant in-breeding began to tell on their constitutions, and the demand for pure animals of either strain consequently began to decline about this time.

In 1836, or thereabouts, the Messrs. Cruikshank, who lived at Sittyton, in Aberdeenshire, began to found a type of Shorthorn cattle on their own account. Contrary to the ideas of Messrs. Booth and Bates, strict pedigree appealed little to the Cruikshanks. Their aim was to breed a butchers' beast, and they bought bulls from anywhere and everywhere, so long as they were individually up to their requirements. Eventually, owing largely to the individual skill of Mr. Amos Cruikshank as a breeder, the herd gained great fame. It was dispersed in 1889, and fell chiefly into the hands of Mr. Duthie of Collynie and Mr. Deane Willis of Bapton Manor, Wiltshire.

These Cruikshank Shorthorns, having nothing of the in-breeding of the Booth and Bates strains, were found to mate

admirably with both, and to-day, in England, owing to the demand in the Argentine for Scotch blood, the majority of herds are found to have been using bulls of this strain.

TYPE OF BEEF SHORTHORN RECOMMENDED.

The demand in the Argentine is for the extreme Scotch type, and while it would be useless to deny that this is very nearly perfect from the butcher's point of view, it is doubtful if it is not too perfect an animal for the bulk of Rhodesia at present. It appears to the writer unwise to sacrifice all the gaiety, style and activity of the older types, when activity is such a necessary quality in our cattle. The type of beef Shorthorn that would seem to meet Rhodesian requirements is one of Booth blood principally (a few strains of Bates blood is no objection, and it is difficult to get animals without it), but with one or two Scotch crosses on the top of its pedigree. Last, but by no means least, he must be a bull individually good, apart from pedigree.

(Continued.)

Agricultural Implements and Dairy Appliances.

We have received from Messrs. A. F. Philip & Co., Ltd., Sections "A" and "B" of their Catalogue, which we commend to the notice of our farming readers. This firm stock every conceivable farming implement, all being selected with a view to the requirements of Rhodesian farmers. It is scarcely necessary to point out how important the matter of spare parts is in connection with the implement trade, a fact thoroughly recognised by Messrs. Philip & Co., and this is quite a feature of their business.

Notes on the Munjanje Tree.

By C. F. M. SWYNNERTON.

The "Munjanje," *Upaca Kirkiana* (Müll. Arg.), is one of the commonest and more useful trees of the open woodlands that occur in so many parts of Southern Rhodesia, and has been from time to time the subject of two misconceptions that are possibly just worth noticing here.

The first is that the "Munjanje" is a "Wild Loquat." I believe I am correct in saying that there is only one Loquat (*Eriobotrya*) in Africa, and that that one is the imported Japanese species. In common with many others of our cultivated fruits, the Loquat is in the Polypetalous order Rosaceæ, and is, therefore, not even a remote relation of *Upaca*, which is in the Monochlamydeous order Euphorbiaceæ, and numbers among its many actual relatives the Cactus-like Euphorbias of our drier parts, the Castor-oil plants, the Crotons, the Manioc and the Ceara and Para rubber trees.

The second misconception consists in a view to the effect that the Munjanje only occurs near old workings in the gold belts, and that it is probable, therefore, that it was originally an importation. Actually it is by no means confined to such situations, and the fact that it has not been recorded from outside Nyasaland, Rhodesia and Zambesia generally, tells sufficiently against the second part of the supposition.

According to Thonner, there are twenty species of *Upaca* in Tropical Africa, all trees and some of them bearing edible fruits. In the Masetter district at all events we appear to have only two species, *U. Kirkiana* (the Munjanje) and *U. Sansibarica* (the "Mutongoro" of the local natives). The first is a smallish but symmetrically-shaped tree with spreading

branches, relatively, seldom much exceeding 30 feet in height. It is highly gregarious, occurring in groves, large or small, with a relatively small admixture of other trees, and when growing closely it often forms very straight poles. It is dioecious, the male and female flowers being borne on separate trees. It is distinctive in appearance: the large dry leathery leaves, with their down-curved edges and rather unusual venation, standing stiffly out round the tips of the otherwise bare, up-turned twigs, render it difficult to mistake the tree for anything that occurs with it. The bark is thick, deeply-furrowed longitudinally on the older stems and branches, grey in coloration, and commonly covered with lichens. Like that of the other trees of our open woodlands, it is well adapted to withstand the action of the annual grass fires. The nearly spherical fruits, an inch or more in diameter, are placed in masses each on a very short pedicel on the thick bare twigs below the leaf-clusters; they are thus made more easily accessible to the hornbills and other relatively large birds that prey on them before they fall. The rind when ripe is russet and yellow in colour and rather tough and astringent, this detracting somewhat, to the European palate, from what would otherwise be an acceptable fruit. The yellow, semi-translucent pulp is juicy and sweet, and varies in amount (relatively to the bulk of the seeds) to such an extent in different trees as to suggest a capacity for improvement by means of selection.

The fruits are eaten and apparently much liked by most of our frugivorous animals, and even by some others: man, buck of various kinds, cattle, small stock, pigs (wild and domestic), baboons, monkeys of both our commoner species, civets, hornbills, parrots, "louries," and other mammals and birds; even, it is said, by lions. This last is very positively asserted by the natives, but they appear to recognise that it is probably the result of hunger, for they say, in effect, "Beware of the lion that eats Munjanje."

The majority of these animals apparently swallow the large, white, three-sided seeds (with outer surface heavily ribbed and running mostly four to a fruit) whole, and so take their share in spreading the tree. The seed-covering is neither very thick nor particularly strong, but it seems to resist digestive action well, and the seeds are often found germinating

in numbers from old droppings. The fruits, the main crop of which ripens from September onwards, are not only useful for pigs, but make a quite good vinegar. They are already frequently utilised for this purpose, and may prove to have yet other uses. Thus a small experiment in distilling them, carried out a good many years ago, is stated to have given satisfactory results. Jam—or rather “butter”—has been made of them, with the addition of spices and lemon juice, and was, the maker tells me, very good. The rinds were then converted into vinegar. But the amount of “butter” was so disproportionate to the quantity of fruit employed and the time spent in preparing it that the experiment seemed hardly worth repeating.

The name “Mahobohobo,” by which the fruits are known in Mashonaland, is replaced in Gazaland, including the Melsetter district, by “Munjanje,” “Mahobohobo” there becoming applied to the bulbils of a yam. The natives, who gather them annually in great quantities, not only eat the Munjanje as a fruit, but produce a palatable gruel by using their pulp in place of water, mixed with the usual “oofoo” (meal).

A certain amount has been said and written about the excellence of the timber, which is light reddish in colour. It has been described as only second in durability to “Rhodesian Teak” and as “the most valuable tree for mining purposes that is found in Rhodesia.” I cannot speak of it in the latter connection from personal experience—doubtless it may be excellent for such timbering as is not required to last for many years—but I cannot help thinking that its durability has been overrated. I have during the past twelve years cut it in various months and used it for various purposes—fencing, rafters, hut-walls, verandah posts and so on. It sometimes stands pretty sound for a few years, but has always been bored eventually, and once the borers have definitely started on it it has usually gone fairly quickly. It is, I should say, distinctly, but by no means absolutely, resistant to white ants. In the ground it rots very quickly indeed. I ought, however, to say at once that I have never tried seasoning it; this might conceivably make a big difference in the matter of its resistance to borers. It splits easily, and is therefore frequently used by the natives for the floors of their raised huts.

The tree is not particular as to elevation, appearing to grow equally well at sea level and at a height probably not exceeding six thousand feet in the Chimanimani Mountains. But it is probably more particular as to soils, preferring, in my experience, well drained schist and sandstone. I have never myself found it on the rich red loams which occur in parts of the Melsetter district, and over an immense tract in the neighbouring Portuguese district of Mossurise. Seedlings come up in large numbers in the droppings of baboons and other animals in the Chirinda Forest, but the conditions—shade, comparative moisture and soil—are evidently against them, and they never last long. The growth of the tree under favourable conditions appears to be moderately rapid, and I have noticed a considerable spread on the part of the species in the neighbourhood of Chirinda during the past twelve years. This is by no means an unmixed advantage, for grass grows but scantily in Munjanje groves, though what does grow is often useful through remaining green at a time of year when it occasionally tends to be scarce elsewhere.

The “Mutongoro” (*Uapaca Sansibarica*, Pax.) is commonly taller and less spreading than the Munjanje. Its bark is not so rough, and its leaves are smaller, more numerous, of a darker, glossier green above and rather less dry in appearance than those of its congener. The fruits are considerably smaller, otherwise very similar, and are also edible. The flowers are much showier, the inner petal-like segments being of a bright yellow colour. I have never found it either gregarious or particularly common, and its preferences in soil are not, apparently, very different to those of *U. Kirkiana*. The timber is usually stated to be far tougher than Munjanje, but, though I have used it, I appear to have no notes or reliable recollections bearing on this point.

Ensilage.

By H. GODFREY MUNDY, F.L.S., Government Agriculturist
and Botanist.

Ensilage, or the making of silage, has been written about so repeatedly and so exhaustively that little originality can be claimed for the following remarks; yet, in spite of this, no apology is needed for emphasising the value of a practice to which South African farmers as yet devote far too little attention. The terms "ensilage" and "silage" are probably more or less familiar to most of us, yet a more intimate acquaintance is frequently wanting, and for this reason it may be well to deal with the subject as though it were entirely new and unfamiliar.

If a definition is sought, we shall find that "ensilage" is the process by which green and sappy fodder is preserved for an indefinite period of time in a succulent state, and in a condition palatable to farm stock. "Silage" is the name given to the product, and the structure or pit in which the fodder is preserved is called a "silo." The term "stack silo" indicates that the product is placed in a stack above ground, and that by applying similar principles the same result is obtained.

A certain amount of mystery is often credited to the making of silage, yet the process is an exceedingly simple one, and merely resolves itself into taking suitable precautions to prevent the ingress of air, once the silo is closed, and so to arrest heating and fermentation before decomposition has gone too far. The storage of grain in pits or huge jars is an applied form of the process, and has been employed by primitive races for centuries. Even to the present day the native races of the African continent adopt this method, which is also in vogue in India, Central America and elsewhere. Ensilage

in its present form has been known in Europe for upwards of a century, and thence has been re-introduced into America, Australia, India, and other countries liable to prolonged droughts, as the surest and most economical method of providing succulent green feed for farm stock during times of scarcity.

Silage is of two kinds—sweet and sour. In the process of making silage, heating and fermentation, accompanied by certain chemical changes, take place, and the character of the product is governed by the rise in temperature which is permitted. A rise in temperature—or heating, as it is more commonly called—is brought about by access of air; hence, if the silo is imperfectly packed, too much air is allowed to enter, over-heating takes place, and if the action is not arrested decomposition sets in, and the product becomes worthless for feeding purposes. It will thus be seen that, strictly speaking, there are not several different kinds of silage, but rather many gradations between two extremes, namely, sour silage and sweet silage. With moderate compression and slow filling, free oxidation takes place and sugar is formed, producing sweet silage.

Heating and chemical changes are due to the oxidising action of the living protoplasm of the cells of which plants are composed. If pressure is exerted immediately, air is excluded and the available oxygen for causing combustion is gradually extracted from the other cell contents; thus the latter slowly pass through various stages of conversion from starch to sugar, to alcohol and acetic acid, finally eventuating in sour silage. Sour silage is usually said to keep better after the silo or stack has been opened for use than sweet silage, and when stock become accustomed to it, they often appear to prefer it. On the other hand, sour silage frequently has a more unpleasant odour, and is therefore more liable than sweet silage to taint the premises and so affect the flavour of milk. When the temperature does not rise above 120 degrees to 130 degrees F. the product is sour or green silage; while between 130 degrees and 160 degrees F. various gradations of sweet or brown silage are reached. Above 160 degrees F. the silage becomes burnt and very undesirable.

For general purposes an intermediary stage between sweet and sour silage is considered most desirable, and this will usually be obtained at a temperature varying from 125 degrees to 135 degrees F.

It must not be thought from the above details that absolute precision of temperature is necessary or even highly desirable. With the utmost care the same gradation is seldom reached two years in succession, and by using ordinary common sense and by following a few simple instructions, good quality silage can be produced without the aid of a thermometer.

In filling or building the silo it is usual to fill in some 4 to 6 feet depth of green fodder at a time, and after allowing this to rise to the desired temperature, to add another layer, and so on. As each subsequent layer is put in it is stamped down firmly, particularly round the sides; thus access of air to the lower layer is prevented, the temperature ceases to rise, and fermentation goes but little further. In a similar manner the temperature of the second layer is permitted to rise to the required height before the third layer is filled in, and so forth. Firm packing at all stages of the operation is absolutely necessary, otherwise too much air will be permitted to enter.

It will now be understood that if for any reason it becomes necessary to fill the silo continuously, thus preventing the temperature from rising, sour silage must be expected; while, on the other hand, should causes arise to delay the filling beyond the prescribed time, there will be a danger of excessive heating, resulting in burnt silage. When this is likely to occur a reasonable amount of water may be thrown over the silage, and in this way the temperature can be lowered.

If the crop is too mature and not sufficiently succulent when cut to give the required fermentation, water may be added to induce the necessary rise in temperature.

Practical farmers usually prepare silage by rule of thumb methods, and when the surface of the mass becomes so hot that the hand and fore-arm can only bear the heat with slight discomfort, more fodder is added. As with other things, practice makes perfect, but no one need be deterred from making an

initial attempt, and if the above instructions are more or less accurately followed, the results in the majority of cases will be surprisingly pleasing. If a thermometer is used, it is customary to set a piece of piping in the middle of the silo and to build around this. The temperature can then be read by attaching a string to the thermometer and lowering it down to the necessary depth in the pipe.

In filling a pit silo the fodder should be brought several feet above ground level to allow for sinkage. Where the pit is sufficiently large, a quiet horse or mule, or even calves, are often lowered and allowed to tramp the fodder, thus taking the place of boys' labour.

Some difference of opinion exists as to the relative merits of using long unchopped fodder as against chaffed fodder, but where both methods have been tested, preference is almost invariably given to chaffing. The machine should be set to cut the material into lengths of from $\frac{1}{2}$ to $1\frac{1}{2}$ inches; and, speaking generally, with coarse fodder the shorter the cut the better.

At first sight it may appear an unnecessary labour and expense to pass the forage through a chaff cutter, but after doing so the process of packing is greatly facilitated; and, when the time comes to open the silo, the material can be handled far more expeditiously, since it can be more easily taken out, and can be filled into bags and carried to the feeding place. Chaffed silage is also better for feeding, since it can be readily mixed with chopped dry forage, crushed maize or meal, where these are also fed. The actual labour of chaffing is not great. The chaff cutter is placed in position beside the silo, the green fodder is brought up and fed into the machine, and as it passes through is packed into the silo. Where a pit is used, the cutter can be placed in such a position that the fodder falls into the pit direct. In making stack silage, long fodder is invariably used. Again it may be emphasised that chaffing, though advantageous, is not wholly necessary, and the fact that a chaff cutter is not available is no good reason for abstaining from making silage.

The relative merits of different forms of silo have been a fruitful source of argument since silage first came into vogue. In America, Australia and other countries where durable

timber is abundant and cheap, the usual form of silo is an overhead erection made of wood and banded with iron, and often taking somewhat the form of a huge barrel. In other instances the structure is made of masonry, and in either case is roofed with wood or iron and has a series of feed doors at convenient spacing up the side. Silos of this nature are costly to construct, and for economic working a blower or elevator is necessary when filling, after the fodder has been chaffed. The chief advantages of these silos is greater ease in handling and the fact that the product is secure from damage from rain or weather. In South Africa, where for the most part the rainfall is a summer one, and where the cost of erecting a timber or masonry structure would be considerable, pit or stack silos will usually commend themselves.

A pit silo is formed by excavating a convenient sized hole in the ground of suitable shape, and may be either round, square, or rectangular oblong. The pit should be dug in soil of a tenacious character, in order that the walls may remain firm and not crumble into the pit. A dry, well-drained position should be chosen, so that the silo may be free from seepage of underground moisture, and similarly means should be taken to protect it from surface drainage. When making the pit in the first instance, the work should not be undertaken until towards the close of the rainy season, and the sowing of crops for silage can be regulated so that they will be ready for cutting about the beginning of April, by which time the heavy rains will for the most part be over. Before commencing to fill the pit it is advisable to line the sides and bottom with coarse grass or green reeds, and thus the silage is protected from coming in direct contact with the earth walls. If brick or stone is available, and presuming a permanent site has been chosen for the pit silo, it is well to face the sides and bottom with this material, and to carry up the brick work or masonry to a height of 2 to 3 feet above ground level. If the silo is to be of a temporary nature only, or where the excavation is in firm, tenacious soil, this is not necessary. Having filled the silo in the manner previously indicated, a good layer of grass is thrown on the surface, and on this a layer of 2 or 3 feet in depth of dry soil well tramped, or a lesser coating of earth, and then one of loose stones to give the necessary weight. The covering of earth should be raised at the centre, so as to throw

off any rain that may fall after the pit has been closed ; or, failing this, and should the pit have been filled early in the season, a few sheets of iron can be placed over it to serve the same purpose. To prevent surface drainage, a low earth bank can be put around the edge of the pit. With pit silos, two or three comparatively small ones are easier to handle than one very large one.

The stack silo is built in the same manner as a hay stack, except that the forage used is green instead of dry. The stack is usually circular, and to facilitate building, it is well to place a circle of poles in the ground and build inside this. The stack is made with long fodder and the butts are usually placed outwards, care being taken that the centre is always higher than the sides, in order to throw off any moisture that may collect. When the stack is completed a thatch of grass is advisable, and pressure is usually put on by weighting the top with large stones or bags of dry earth, though in some cases these are replaced by heavy baulks of timber. In the latter case, by means of chains passing over the stack and pulleys, pressure is exerted and the fodder is pressed down firmly. Yet another method is to make the stack in a slight excavation and to ride the wagon on to the stack, empty it, and then ride it off on the other side. In this way the stack has sloping sides, and the fodder is firmly pressed down by the weight of the wagon and the animals continually passing over it.

Pit and stack silos each have their advocates. For the latter it is claimed that less labour is required, while the animals can be permitted to feed direct from the stack. On the other hand, it is more difficult to exert the required pressure, and a considerable area of the stack is exposed to the atmosphere, thus entailing much waste. The writer personally favours pit silos for this country as being more economical, and, as a general rule, producing better quality silage ; though in certain cases, where it is desired to preserve very large amounts of fodder in this form, and where feeding by hand would entail too great labour, stack silos undoubtedly have their advantages.

Consideration must be given to a suitable site for the silo. Masonry and timber silos are usually only constructed where cattle are fed under shelter or in byres, and in such cases are

built close to or as part of the main building, in order that feeding can be carried on expeditiously and with a minimum of labour. Pit or stack silos should always be situated on rising, well-drained ground. When choosing a site it must be remembered that silage is weighty and bulky to handle, and the silo should therefore be in as close proximity to the feeding place as possible.

Generally speaking, any succulent green crops are suitable for ensilage, but some are better adapted and of higher feeding value than others. Grass silage is occasionally made, but as a rule it is better to grow crops expressly for this purpose, and the cost of growing and cutting a cultivated crop yielding six to fifteen tons per acre will not greatly exceed that of cutting, raking and collecting a far greater area of veld grass, while the feeding value can be made immeasurably higher. The following crops are eminently suited for the purpose, and, as experience has shewn, can be readily grown in Southern Rhodesia, often on land which requires a rest from the staple crop: Maize (*Zea mays*); Sweet sorghum, "Imphe" (*Sorghum saccharatum*); Pearl millet, "Nyouti" (*Pennisetum spicatum*); Manna (*Setaria Italica*); Japanese millet (*Panicum crus-galli*); Finger millet, "Rapoka," "Rukweza" (*Eleusine coracana*); Toesinte (*Euchloa mexicana*); Sugar cane (*Saccharum officinarum*); Velvet beans (*Mucuna utilis*); Cowpeas (*Vigna catjang*); Kaffir beans (*Vigna catjang* var.); and Sunflower (*Helianthus annuus*). Amongst the finer strawed crops we must include Boer manna, Japanese millet and Egyptian clover. These latter are, however, equally suitable for conversion into dry fodder, and would usually be saleable at a good price on local markets. Boer manna has already established its reputation as a useful crop in rotation with maize, while heavy yields of velvet beans and Kaffir beans may frequently be obtained from lands which are becoming exhausted from continuous maize cropping, and which would otherwise be allowed to lie idle, incidentally becoming a fruitful source for the dissemination of weed seeds throughout the rest of the farm.

A decision as to what crops to grow must be based on the class of land available and the prevailing conditions of climate. Maize is probably the best all round crop for silage, and, where

a leguminous crop is required, cowpeas for sandy soil and velvet beans for heavier soils are recommended. It may be remembered that the addition of leguminous crops will greatly enhance the feeding value of the silage, and in actual practice about one-third bean, pea or clover forage to two-thirds maize, sorghum, etc., has been found a desirable proportion.

The best time of cutting varies somewhat with the different crops. For silage, maize is usually considered in the best condition when the grain is just reaching the "glazed stage." If cut later than this, it is somewhat liable to turn mouldy. Sorghums and millets are best cut when a little short of maturity, while cowpeas and velvet beans are probably in the most suitable condition when the beans are well formed in the pod, but not yet hard. As with lucerne, clovers should be cut when in flower.

Silage can be fed to all classes of farm live stock, but more particularly to cattle. It is especially useful for stimulating the flow of milk—hence its popularity amongst dairy farmers. It is often fed to sheep with great advantage, both before and after lambing time. Stock unaccustomed to silage frequently refuse it at first, but soon learn to appreciate it and eat it with avidity. When commencing to feed, only small quantities should be given and the amount gradually increased. No more should be given than can be consumed at one feeding, as it rapidly deteriorates and becomes unwholesome. In feeding dairy cattle the silage should always be given directly after the cows are milked, not immediately before or during milking. Any silage not eaten should be carefully removed from the cow-shed before the next milking. If these precautions are observed, there is little danger of the silage affecting the flavour of the milk. For cows 20 to 40 lbs. of silage can be fed per diem, in addition to dry forage, meal, etc., and to other stock in proportion.

The feeding value of pure maize silage is somewhat higher than that of root crops such as mangels, swedes, turnips; and in countries where the climatic conditions make the growing of these somewhat precarious, maize silage can advantageously be used to replace them in the feeding ration.

Since crops for silage are cut green and preserved in a green condition, the weight of silage taken out after a period of several months will roughly approximate the weight of fodder cut from the field. Taking lucerne as an example, a crop running three tons to the acre will furnish approximately three tons of silage; yet this, if converted into hay, would only produce about one ton of dry fodder. Similarly, 180 tons of lucerne silage—equivalent to about 60 tons of lucerne hay—would contain about 54 tons of dry matter, and would occupy less space than 23 tons of lucerne hay, containing 20 tons of dry matter. With well tramped and chopped silage a cubic foot will weigh about 30 to 40 lbs.; hence a small pit silo with measurements—length 18ft., width 8ft., and depth 6ft., will contain about 12 tons, while a larger pit 30ft. by 15ft. by 9ft. will hold approximately 60 tons of silage. The form of pit here indicated is rectangular, since in practice, when opening up the silo, a smaller surface can be exposed to the air, and there is therefore less waste. For the same reason an oblong rectangular pit is preferable to a square one. On the other hand, it is easier to pack the sides of a circular pit, and great care must be taken to tramp the fodder well down in the corners of rectangular ones.

With circular silos having a depth of 20ft. the following approximate contents will be obtained :—

Diameter.	Content.
12ft.	34 tons
18ft.	75 tons
24ft.	135 tons

Silage is a succulent, palatable and nutritious food which can be drawn upon any time after the first two or three months of laying it down, and which can be grown and prepared with a minimum of risk and expense. It is the safest and cheapest method of providing succulent winter feed, without which in some form or another no stock, and in particular milch animals, can be expected to thrive to best advantage.

Citrus Growing in Rhodesia.

MAZOE CITRUS SYNDICATE'S ENTERPRISE.

An enterprise of great interest and one of considerable importance to this country is that undertaken by the Mazoe Citrus Syndicate, which was formed in 1909 and is now carrying on operations on the farms Smithfield, Brundret and Glenbervie. These farms are approximately 9,000 acres in extent, and are situate on the east side of the Mazoe River, this river forming the western boundary of the estate, which commences near the point of junction of the Tatagura and Mazoe Rivers.

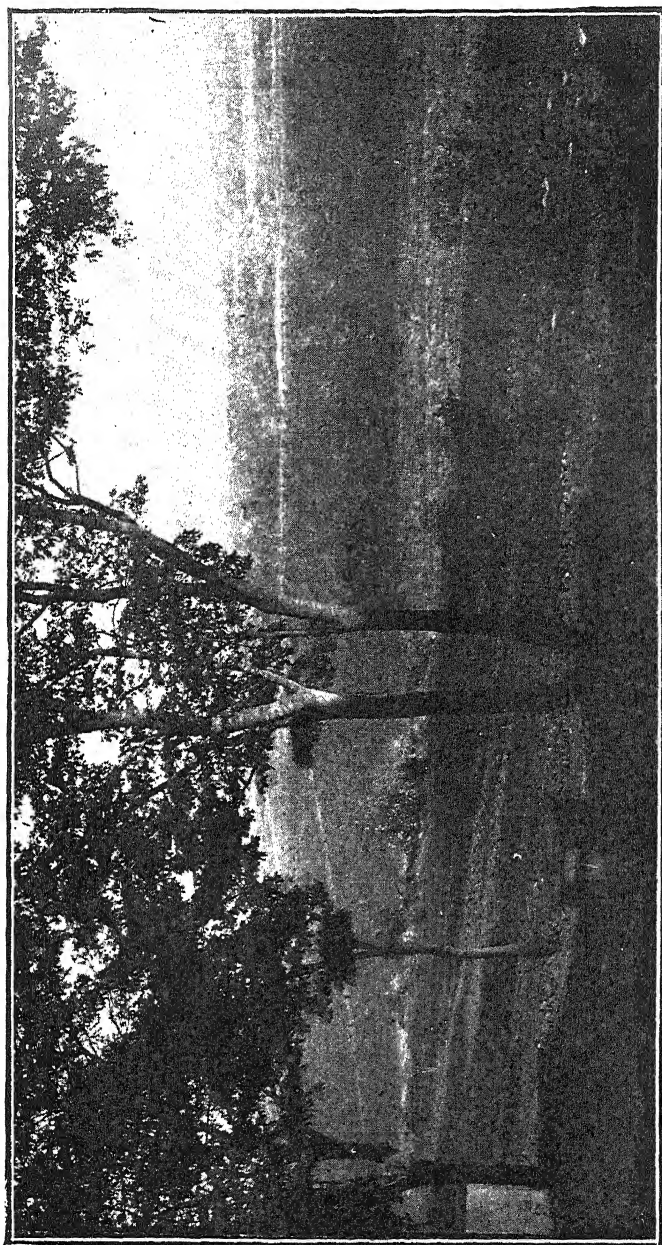
With one or two exceptions, little has been done up to the present in Rhodesia in the way of growing citrus fruits on approved lines, but the results attained are sufficient to encourage the belief that with the adoption of up-to-date methods a fruit can be grown here that will command a ready sale on the London market. Then the fact that the Rhodesian product ripens during our dry season, and thus enables the fruit to be placed on the home market at a time when there are practically no supplies forthcoming from other sources, is an advantage of very considerable importance.

There is every reason to believe that Rhodesia is eminently adapted to the growing of citrus fruits, and if the Mazoe Citrus Syndicate succeed in opening up an overseas market, there is a prospect of an industry of immense possibilities being established. The progress of the Syndicate's operations will be followed with close interest.

At Smithfield the Syndicate has a grove containing 2,000 of the Washington Navel variety of orange planted 24 feet apart, and budded about 4 inches from the ground on the native wild lemon stock, which appears peculiarly suited to the



A two-year-old Washington Navel Orange Tree at the Mazoe Citrus Syndicate's plantation.



"Smithfield."—One of the Mazoe Citrus Syndicate's farms.

conditions prevailing in this country. One thousand of these trees were set out in February, 1910, the buds being at that time two years old. The second thousand were set out in December, 1911, the buds then being only one year old.

The first one thousand trees are of a good healthy colour, and compare favourably with trees of their age in any citrus growing country. The following shews the measurements of twelve trees taken at intervals from one row in the grove :—

No.	Height. Feet.	Circumference of spread of top.	Circumference of stock at union.
		Feet.	Inches.
1	7	12	5½
2	5	10	5
3	6	13	6½
4	5	12	7
5	6	11	6
6	6½	13	6½
7	7	13	6½
8	4½	9	5
9	7	13½	7
10	7	14½	6
11	6	15	7
12	6	15	7

Average—6ft. 1in. 12ft. 7in. 6½in.

One tree in this grove, on which are 75 well set fruit, measures :—

Height.	Circumference of spread of top.	Circumference of stock at union.
7 ft.	18 ft.	8½ inches

The average tree in the youngest lot measures :—

4 ft. 6½ ft. 4½ inches

This is a good growth, when it is remembered that these trees were only one year old from the bud when set out in the grove a year ago.

There are also, in addition to the 2,000 Navel trees, 28 Satsumas, 58 Valentias and 10 lemon. These were planted three years ago on high rocky ground forming part of the kopje on which were built the huts for the housing accommo-

dation of the manager and his staff. The site is too hard and stony to admit of the use of a plough, a little stirring of the surface with a cultivator being all the work these trees have had. The present condition of most of the trees, after nearly eight months of continued drought, is remarkable, their foliage being fresh and green and shewing no indication of lack of moisture. A tree of the Valentia variety measures 9 feet in height, 20 feet circumference of spread of top and 11 inches circumference of stock at union, and is carrying 150 well set fruit—about one half of them being from an early bloom, and one-third in size. The largest of the lemons is 10 feet in height, 20 feet in circumference of top and 9 inches circumference of stock at union, but carries no fruit.

At the nurseries there are :—

- 6,000 Washington Navel, one year old from the bud.
- 3,000 Valentias, one year old from the bud.
- 1,000 Villa Franca lemon, one year old from the bud.
- 5,000 Villa Franca lemon, budded June, 1912.
- 4,000 Mazoe lemon stock, unbudded.

All the nursery stock is on the native wild lemon, and is in good condition. No commercial fertiliser or other manure has been used either on the groves or nurseries.

At Brundret, which adjoins Smithfield on the north, it is the intention to set out 3,000 trees of various types during the present wet season.

At the southern end of the Syndicate's holdings the soil is a rich deep loam of dark red colour and of great depth. Proceeding north, the colour of the soil changes gradually to a dark brown, and is richer in humus and perhaps more friable than the red land. In this part of the valley the land does not retain quite the same characteristics for its entire width from the river to the base of the mountains on the east, but takes on in many places a lighter colour and contains much more sand in its formation. This quality of soil, though perhaps not quite so good for general farming purposes, is probably quite as suitable for the sites of orange and lemon groves as the richer lower land nearer the river, such lighter sandy land usually producing bright thin-skinned fruit, with good carrying qualities.

From the south to the north boundary the land slopes from the base of the mountains to the river, and the grade is ample to ensure perfect drainage and at the same time not sufficient to create any great danger from excessive washing in the rainy season.

The ideal season for citrus fruit growing is one in which the rainfall occurs through the warm and growing season of the year, beginning after the crop has been marketed and ceasing before the new one is ready. The Mazoe Valley, like the rest of Rhodesia, enjoys exactly these conditions. In a normal season about 33 inches of rain fall between the months of November and May, the first showers coming at the end of October, the remainder of the year being dry and bright, enabling the grower to gather and pack fruit under the most favourable conditions for ensuring its keeping and carrying qualities.

The slight frosts encountered at the Syndicate's holdings have not injured the trees, but are likely to be beneficial to the fruit by sweetening and improving the quality. There is no disease present in the groves.

Although it has been proved that citrus fruit trees can be brought to the bearing age in Rhodesia without application of artificial irrigation, there is no doubt that it is highly desirable to make provision for the application of water in exceptionally dry seasons, or, in fact, each dry season, if the yield and quality of the fruit are increased thereby.

The Syndicate is now engaged on an irrigation scheme, which is nearing completion, and, it is hoped, will be operative during the next dry season. The Mazoe River will be diverted about a quarter of a mile below the drift on the old Mazoe-Kimberley Reefs Road, and from there carried in a channel, having a fall of 1 foot per 1,000 feet, across the farms Smithfield and Brundret. The diversion works will consist of a dry-stone weir with a concrete core about 8 feet high. The weir, which is under construction, has been founded on an outcrop of epi-diorite rock, and the concrete core has already been satisfactorily completed, no serious quantity of water being lost. Below the weir headgates are to be erected, so that the

water entering the furrow can be kept under control, and between the weir and headgates the banks of the river will be protected by a drystone apron, so as to prevent any breach by floods. While the irrigation works are simple and comparatively inexpensive, the furrow has had to be excavated through very false ground to a depth of as much as 18 feet, and quite a considerable amount of trouble has been experienced. The total length of the main channel will be about seven miles, but this year it is proposed to proceed only three miles. The supply of water from the river has not been accurately measured over any prolonged period, but in normal years it is expected that a sufficient supply will be obtainable for the irrigation of at least 300 acres of land with citrus trees and cereal crops. This area could be greatly increased by making provision for the storage of the vast quantities of water which run to waste in the rainy season.

Notes on Bee-Keeping.

By FREDERICK SWORDER.

Before commencing bee-keeping there are several points which require to be carefully weighed by the beginner. Among them may be mentioned : adaptability to carry on the pursuit ; a suitable position for the apiary ; the type of hive ; the mode of securing the first stock of bees ; whether prospective results will warrant the outlay ; the possibilities of the district for honey production ; the time at his disposal to give the bees a reasonable amount of attention ; the facilities for the safe transit of the product ; and finally the market.

Having carefully read the previous article on subduing and handling bees, the bee-keeper, although he may at his first attempt feel somewhat doubtful as to his capabilities, will by the application of those hints, combined with practice, very soon be able to manage for himself.

The majority of the publications with which I am acquainted give the advice that bees should be handled in the middle of the day, when honey is coming in freely. From my own experience in a cooler climate than Rhodesia, this advice has proved to be sound, but as our conditions are so totally different, we must in summer, if we wish to ensure quietude in the apiary, always examine the hives in the cool of the early morning, for the older bees, which are usually more inclined to sting than their younger sisters, are then away gathering the nectar and pollen which have formed in the blooms the previous night. Besides this, owing to the chilly atmosphere then prevailing, the bees have a distinct inclination to cling to those combs containing sealed and unsealed brood, thereby affording that protection essential for the preservation of bee life.

As promised in the October notes, I will describe the simple preparation of the carbolic cloth, the advantage of which in such operations as the subduing of bees preparatory to removing and replacing either section, or shallow frame crates, transferring, etc., over the smoker, will be apparent.

In the first place, procure a piece of calico, canvas or bed ticking about 2 feet square, and then purchase from a chemist a small bottle of Calvert's No. 5 carbolic acid—do not be persuaded to buy it in any other form. Dilute a portion of this with double its quantity of water, and then sprinkle this mixture on the outspread cloth. The carbolic cloth is now ready for use. By laying it over the tops of the hive frames, bees will in all cases flee from its powerful odour, and while not resenting its application, they become thoroughly subdued. The cloth will retain its scent for some weeks, if, when finished with, it is rolled up and placed in an air-tight tin or a 1 lb. screw-top honey bottle. To prevent the cloth being blown about when in use, a small stone knotted into each corner, to serve as weights, will answer well. As a rule a strong stock, ranging from 30,000 to 60,000 bees or more, is not so easily dealt with as a weaker one, the former necessitating a little more care and patience, both in lifting out the frames from, and returning these to, the brood chamber.

In the early spring it occasionally happens that there is a shortage of stores, often brought about through the unwise plan of removing the last ounce of food from the brood chamber at the time of packing bees down for winter quarters. Needless to say, through lack of these stores, bees are not then so readily subdued, because they are not able to gorge; but if they are well sprinkled with warm syrup (white cane sugar dissolved in hot water), a change for the better soon comes over them.

In opening a hive, proceed as follows:—Light the smoker and adjust your veil; then blow four or five puffs of smoke into the entrance as previously mentioned. Remove the roof and the hive lift, after which take off the majority of the cloth coverings or quilts. The one remaining quilt, which will be glued fast to the frames by the bees, is best removed by taking hold of one corner and partially peeling it off diagonally towards you. While loosening this remaining quilt, gently

blow a few puffs of smoke over the frames; this will tend to keep the bees in subjection, for by this time they will have had sufficient time to gorge. Should they shew any inclination to become unmanageable, use larger volumes of smoke, and for about half a minute replace this one quilt, which, so far, has not been entirely removed, but only loosened. Again peel off this quilt, for the bees should now be more subdued and in a condition to be examined.

In most instances in Rhodesia it will be found that the frames are fastened together with a superabundance of propolis (a sticky substance, closely resembling rubber solution, brought home by bees to stop up all crevices). They should be carefully loosened with a screw driver before lifting them out. Before removing the first frame from the brood chamber, provide or give sufficient room to accomplish it easily and without crushing bees between the combs, by either moving the dummy or division board laterally, or lifting it out of the hive; thus in either case the requisite amount of space is available. The smoker should be placed close at hand in an upright position on the hive lift; and this lift, when set on its end adjacent to the hive, will during any manipulation be found very useful. Grasp one end of the top bar of the frame with the index finger and thumb of the right hand, and do exactly the same with the left, then slowly lift out the first frame, *i.e.*, the one nearest to you, without crushing a bee. This frame may contain nothing but honey, and it can, therefore, be set on its end on the ground against the hive. If, for any particular purpose, it becomes necessary to remove all the frames, proceed in rotation.

Probably, in the second frame and the centre ones, will be seen eggs, unsealed larvæ or tiny white grubs; also sealed larvæ with coffee-coloured flat cappings, honey and pollen. This, and the remaining frames, after close scrutiny, should be returned to the hive, thereby avoiding any chance of chilling the brood. Having completed our inspection, the frame which was removed and had been set on the ground, can now be gently replaced in the opposite side from which it was removed. In order to avoid crushing bees when replacing this or any frame, smoke the bees away from the spot where the frame is to rest. As far as possible make a mental note of what has been seen, and in all cases as the frames are being

returned keep them covered with a quilt. Now that our inspection is finished, replace the hive lift. Into this pack the remaining warm clothing and put it on the roof.

Where the novice is far removed from civilisation or there is little possibility of meeting someone capable of imparting the instruction for which he is craving, the above hints may be studied with interest and advantage, but a practical demonstration carried out in a few minutes, with a brief description of the anatomy and habits of bees, will convey to him a far more lasting impression than sheets of print.

Meat Exports.

Four of the Australian States sent meat to the United Kingdom in 1911, the non-exporters being Tasmania and Western Australia. The exports totalled 1,962,008 carcasses of mutton, 1,649,043 of lamb, and 521,654 quarters of beef. Compared with the figures for 1910, the exports shew a decrease of 28 per cent. in mutton, an increase of 12 per cent. in lamb, with beef nearly steady. In the case of each class of produce, more than one-half of the total export came from one particular State. Thus New South Wales sent 59 per cent. of the mutton, Victoria 65 per cent. of the lamb, and Queensland 95 per cent. of the beef shipped from the Commonwealth. The Agent General in London reports the prospects for trade with the United Kingdom in 1912 to be "very satisfactory" from the Australian point of view. From time to time during the last six years, efforts have been made to induce the Continental Governments to allow the import of frozen meat into their dominions, but regarding this he states :—"Speaking generally of European countries, I fear they are all impervious to external pressure in the matter of the removal of trade restrictions. There are many thousands of workmen in all the great industrial countries who rarely taste fresh meat; it cannot be supposed this condition will last for ever, and when the barriers against the importation of frozen meat are broken down, it will be by pressure from within." The position is encouraging to those who take long views.—*Victoria Agricultural Journal*.

Notes on the Sowing of some Rhodesian Crops.

By H. GODFREY MUNDY, F.L.S., Government Agriculturist
and Botanist.

In view of the increased interest in the question of crop rotation, and having regard also to the plans which many farmers have made for growing, during the present season, supplies of winter feed for their stock, a few notes on the most suitable dates for sowing some of the less well-known crops may be acceptable. Several of the crops referred to will have already been grown by some farmers, and differences of opinion may exist as to the best date for sowing. The advice put forward in these notes is based on the results of the past three years' experimental work conducted on the Government Experiment Farms and in co-operation with private farmers.

The date of sowing has an important bearing on the resulting crop, and it should be remembered that each individual crop possesses peculiarities which must be taken into consideration when deciding upon the date of seeding. For instance, mangels and ground-nuts require a long growing season, and results are often disappointing when sowing is delayed too late. With Boer manna, Japanese millet and oats, only one cutting of forage is expected, and it is desirable that this should not be ready for reaping until the close of the rainy season, when weather conditions favourable for curing may be expected. Such crops as Teff grass and Egyptian clover, from which two or even more cuttings may sometimes be obtained, call for comparatively early sowing, in order that there may be sufficient moisture in the soil to bring the successive growths to maturity. The rainfall on different farms and in different districts varies considerably, and due allowance must always be

made for this. It is obviously impossible, therefore, to fix arbitrary dates of sowing, and in the following notes the dates given should be considered as relative to the usual date at which maize is planted in that particular locality. In districts of light rainfall, and speaking generally, all crops should be sown earlier; while greater care must be devoted to the preparation of the land and to subsequent cultivation in order to conserve moisture.

It may be remembered that almost all crops will give better results when the seed is drilled rather than when broadcasted. With root crops drilling is essential to success, as also is frequent subsequent cultivation. One of the primary objects of drilling is to facilitate cultivation, whereby a soil mulch is maintained and the growth of weeds is checked.

Harrowing and rolling also when the plants are 2 to 4 ins. high is nearly always beneficial to summer cereal crops such as wheat, oats and manna. If the soil is of a loose character a weeder can be used instead of a spike harrow. The rolling of land sown to Teff grass is also recommended.

MAIZE, as the staple crop, may be taken as the standard, and should be planted first. Usually from mid November to mid December is best. Plantings delayed until after Christmas do not, as a rule, give as good a yield as earlier plantings. Maize grown for silage or dry fodder is usually not put in until the first week in January. Sown at this date, the crop should be ready for the silo at the close of the rains.

ROOT CROPS.—Mangels and other roots should always be grown on manured land, six to eight tons of kraal manure per acre being a reasonable dressing. Mangels should be the first sown of the roots, immediately after the main crop of maize, but in no case later than Christmas. Turnips and swedes are not in great favour; when grown, sowing should be about the same date, but carrots and kohlrabi may be held back until the beginning of January.

PUMPKINS AND CATTLE MELONS.—Differences of opinion exist as to the best time for sowing these crops. With pure stands, in the writer's opinion, early sowing, not later than the middle of December, is desirable. Plant in hills 8 by 8 ft. to 12 by 12 ft.; $2\frac{1}{2}$ to 3 lbs. of seed is required per acre.

BEANS.—Sow velvet beans in drills 3 by 2 ft. About 25 lbs. seed per acre. Crop should be planted by Christmas, but in any case not later than the end of December. Cow-peas are quicker to mature. Sow first week in January, about 30 to 35 lbs. seed per acre, in drills about $2\frac{1}{2}$ by $1\frac{1}{2}$ ft. The above crops may also be sown broad-cast, in which case double the quantity of seed is usually allowed. Beans of the haricot or Canadian Wonder type should always be drilled in rows about $2\frac{1}{2}$ by 1 ft. On the Experiment Stations the best results with the latter have been obtained by sowing from the 6th to the 10th January.

LINSEED.—The large seeded variety sometimes termed "local" is slower than the others to mature, and should be sown during Christmas week. Pskoff, Riga, White Flowering and Yellow seeded varieties may be sown up to the 12th January. If drilled in rows 8 inches apart with a small grain drill, 25 lbs. seed per acre is sufficient; but, if broad-casted, about 35 to 40 lbs. is usually used.

VICTORIA WHEAT should be sown the first few days of January; 50 to 60 lbs. seed per acre, drilled or broad-cast.

BOER MANNA.—Sow from 25th December to 5th January, broad-cast or drilled; 10 to 15 lbs. seed per acre.

JAPANESE MILLET.—Sown similarly to Boer manna, but thrives better on black soil, and may be sown up to the middle of January.

TEFF GRASS.—If used as a catch crop, may be sown as late as the 20th January, but for a main crop is better put in about Christmas; 5 to 7 lbs. of seed per acre, broad-cast, mixed with two to four times its bulk of sand or dry earth.

EGYPTIAN CLOVER.—Sow during cloudy weather, from the middle to the end of December. If in drills 8 inches apart, 20 lbs. seed per acre; if broad-casted, 25 to 30 lbs.

SUMMER OATS.—The Algerian oat has so far been found the most certain as a summer crop, but slow to mature, and should therefore be sown early—from Christmas to the end of December. The Sidonian and New Zealand oats are also being tried successfully. The former is the quicker maturing strain, and can be sown on red land as late as the 10th January. New

Zealand oats should be put in about the same time, or a little earlier, if anything. When drilled, 45 to 50 lbs. seed per acre is required, and when broad-casted 60 lbs. As *summer* catch crops on moisture-retaining black soil the sowing of all these varieties may be delayed from three weeks to a month.

GROUND-NUTS should be sown in drills $2\frac{1}{2}$ by 1 ft. apart. About 25 lbs. of shelled nuts are required per acre, and the crop should be in the ground by Christmas. Later planting frequently results in the kernels failing to fill.

VETCHES.—The scarlet vetch makes a useful mixed crop sown with Boer manna, and adds considerably to the feeding value of the hay. The vetches—30 to 40 lbs. seed per acre—should be sown a week or ten days before the manna. Manna seed is broad-casted and lightly harrowed in with a weeder; 8 lbs. of manna seed per acre.

CHICORY.—Drilled in rows $2\frac{1}{2}$ ft. apart, and singled out so that the plants stand 8 inches apart in the rows. Sow end of December or beginning of January. Seed per acre, 2 to 4 lbs.

BUCKWHEAT.—A useful quick maturing catch crop. Sow from December to mid January. Seeding varies; usually 35 to 45 lbs. per acre broad-casted.

LUCERNE.—Always sow in drills, about 15 to 20 inches apart—during cloudy weather in January; 15 lbs. seed per acre. Grown under irrigation, may be sown about March or August. The very young seedlings should not be subjected to the likelihood of frosts.

POTATOES.—Main crop, end of December to end of January. Early spring crops under irrigation or on naturally damp soil, August, or earlier if frosts are not prevalent. Amount of seed tubers per acre, 1,200 to 1,500 lbs., depending on size.

SUNFLOWER.—Sow from mid December to mid January in drills 3 by $1\frac{1}{2}$ ft.; 6 to 12 lbs. seed per acre.

KAFFIR CORN.—As for sunflower.

COTTON.—Plant in drills 3 to 4 ft. by $1\frac{1}{2}$ to 2 ft. Seed should be sown as early as rains will permit.

RAPE AND KALE.—Sow in January in drills 15 to 20 inches apart; 4 to 5 lbs. seed; or, if broad-casted, 8 to 10 lbs. per acre.

TEOSINTE.—This crop is not grown extensively. It requires early planting on rich land, and it is doubtful whether it is as valuable as sugar cane or Napier's fodder. Plant early in November in hills 4 by 4 ft.; 2 to 4 lbs. seed per acre. Several seeds to a hill.

FLORIDA BEGGAR WEED.—Sow as for lucerne.

SUGAR CANE AND NAPIER'S FODDER.—Useful crops for silage, feeding green or grazing. Established from cuttings or rooted slips in December, in hills 4 by 4 ft. to 6 by 4 ft.

CASSAVA.—Established from cuttings in December, 4 by 4 ft. apart.

SWEET POTATOES.—Best established in December or January from sprouted tubers, rooted slips or cuttings. A good plan is to plant out cuttings between the maize crop about the beginning of February, when the crop will mature about fifteen months later. Distance of planting, about 3 by 3 ft.

WINTER PASTURE GRASSES.—Usual sowing about 20 to 30 lbs. per acre. Paspalum, 12 to 15 lbs. Paspalum and Burnet may be sown with the first good rains; all other varieties are better sown during cloudy weather towards the end of December or beginning of January. With Paspalum and Phalaris bulbosa the young plants or rooted slips from a nursery may be transplanted into ploughed or scuffled ground about January.

Thunderstorms and Lightning Conductors.

By W. MARTIN WATT, Agricultural Engineer.

Several enquiries having come through the Department of Agriculture as to the best method of safeguarding buildings from the destructive effects of lightning, it is considered that a few notes upon the subject will be of interest.

The theory of thunderstorms generally accepted is chiefly based upon the fact that a charge of electricity is distributed upon the surface of a body and not throughout its substance. Gases and vapours being composed of a multitude of minute particles, any particle may receive a bodily electric charge, and, as in the case of the clouds of our atmosphere, these minute particles may unite by the attraction of gravity to form a larger particle or drop, having a proportionately smaller surface area and consequently a higher electric potential. Assuming that eight small particles of cloud vapour unite into one drop, the resulting drop would have eight times the quantity of electricity distributed over its surface, and as the radius of this drop would be only twice as much as the component drops, the electric potential would be increased by four. If we accept this theory, it will be readily seen that the potential electrification of the surface of our atmospheric clouds must rise by the coalescence of these drops, and by electrical induction set up an opposite kind of electricity on the opposing earth's surface. Whenever the potential electrification reaches a certain point, the strain becomes so great that a disruptive discharge takes place, causing the lightning flash, and temporarily balancing the electric attraction between the surfaces of the cloud and earth. Further flashes occur probably

owing to further coalescence of drops and to the internal attractions and discharges of the cloud. A flash of lightning may be over a mile in length and rarely exceeds a velocity of $1/100000$ of a second.

Three kinds of lightning have been distinguished: (1) forked lightning, (2) sheet lightning, (3) globular lightning. The forked or zig-zag nature of forked lightning is probably due to the air being of varying conductive power, and to the fact that an electric discharge appears to follow the line of best conductivity.

Sheet lightning is supposed to be merely the reflection in the sky of forked lightning.

Globular lightning is a rather rare phenomenon, although the following is a report of a well authenticated observation of such, seen in this Territory:—

“On the evening of the 1st or 2nd of September, 1910, about nine o'clock, the attention of Mr. S. Biggs of Mazoe was drawn to a ball of fire, the colour of an electric light, apparently about 1 ft. 6 in. by 10 in. in size, the shape resembling a Rugby football, which was in a stationary position over a road on his farm leading to the homestead. It remained in this position for the space of five minutes, and Mr. Biggs approached to within three yards. The light then moved in a northerly direction at about six miles an hour, eventually entering a belt of trees. Mr. Biggs followed and fired at it at a distance of about 15 yards, the lightning later on disappearing. A curious and noticeable feature of the observation was the fact that although the lightning entered a thick belt of trees, it left no trace of its flight whatever, apparently not coming into contact with any object. Its manner of travelling appeared to be in a zig-zag fashion. The lightning was luminous and transparent; it cast no light beyond its own body and left no odour. It finally disappeared from sight at about fifty yards' distance. No explosion was heard, and a subsequent search disclosed nothing.

“Another noticeable feature was the complete absence of any atmospherical disturbance. The evening was perfectly calm, the sky cloudless and a very bright moon shining. The

farm is situated close to the contact of the schistose and granite formations, latitude 17 degs. 22 mins. south; longitude 30 degs. 57 mins. east, and about 4,890 feet above sea level.

"The natives are familiar with these occurrences, regarding them with considerable fear."

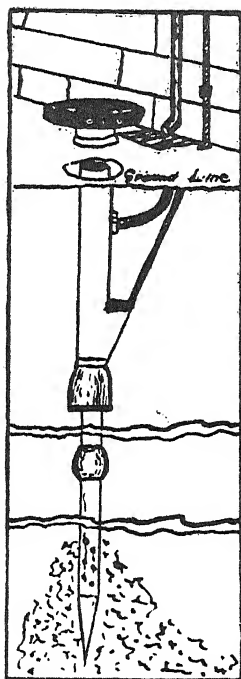
Observations of globular lightning are not unusual in Southern Rhodesia, but it is seldom that so lucid an account as that of Mr. Biggs is obtainable. The account will be found in some respects to resemble that given in Arrhenius' "*Lehrbuch der Kosmischen Physik*," p. 776, and a comparison of the two reports is interesting.

The first person to suggest lightning conductors for the safeguarding of property from destruction by lightning was Franklin in 1749. Since then, while the general principles are mostly agreed upon, many of the details are still affording scientists ample scope for controversy. One debateable point is the relative efficiency of iron and copper as lightning conductors. Such authorities as Sir Oliver Lodge and Sylvanus Thompson independently and for different reasons recommend iron conductors. As iron is much cheaper than copper, it can under certain conditions be safely recommended. It is, however, more liable to corrosion than copper.

The essentials of a good lightning conductor are :

(1) That its apex consist of an aigrette of three or more fine points firmly screwed into a solid casting. The points should be plated or gilded to prevent corrosion, or, in the case of a rough farm installation, well tinned. In estimating the height of the top of the conductor above a building, it may be assumed that 1 foot is required for every 10 feet in height, with a minimum height of 3 feet, and that the area protected by the conductor will be approximately equal to a circle whose radius is equal to the height of the conductor above the ground.

(2) That it has a thorough earth connection either (a) by attaching the conductor to a copper plate not less than 9 square feet in area, sunk to such a depth as to ensure the plate always being in moist ground, the plate to be surrounded by broken coke free from sulphur; (b) by connecting with a well or



Rough sketch of Hedge's Patent Tubular Earth Connection.

stream (this can occasionally be done by making a connection with the pipes in a borehole or well, but care must be taken to ensure a perfect conductive connection); (c) by the tubular earth system; (d) by fastening to a spike harrow (preferably galvanised), with the spikes pointing downwards; (e) by connecting to a basket of wire netting containing not less than 3 bushels of coke, sunk in moist earth; (f) or by connecting to a sufficiently large quantity of old scrap metal imbedded in wet ground.

(3) That the conductor be connected by means of wire ropes to all the metal work of the building, such as roofs, flashings, ridgings, gutterings, finials, cowls, down-pipes, etc. On no account use insulators to keep the conductor away from walls, etc. Pipe crampets or saddles should be used for fastening purposes, and the conductor should be fastened to the wall face.

(4) That the conductor be of sufficient conductive power. The size of the conductors for large buildings should be as follows :—

Copper rod $\frac{1}{2}$ in. dia., weighing .75lb. per ft. run.

Copper tape $1\frac{1}{2}$ in. by $\frac{3}{8}$ in., weighing .72lb. per ft. run.

Copper tube $\frac{5}{8}$ in. external dia. by $\frac{1}{8}$ in. thick, weighing .757lb. per ft.

Iron tape 2in. by $\frac{3}{8}$ in., weighing 2.526lb. per ft. run.

The minimum sizes used should not be less than copper (90 per cent. pure) No. 3, standard wire gauge, or $\frac{1}{4}$ in. diameter, weighing 6lb. per yard, or the equivalent in tape. The minimum for iron should be eight times the sectional area of the foregoing sizes, or approximately equal to a rod or rope $\frac{3}{4}$ in. diameter.

(5) That the conductor from apex to earth connection be as straight as possible and all sharp bends avoided, and the minimum of joints be introduced.

Conductors are made in a variety of forms: (1) round solid rods; (2) round hollow tubes; (3) tape sections; and (4) wire ropes. The last three sections are to be preferred, as

they present a proportionately larger surface area to the solid section; and, as the electric charge passing through a lightning conductor is of an alternating character, it benefits by what Lord Kelvin describes as the "skin effect."

In a tubular earth connection the joint between the cable and junction piece is made by caulking with lead. The point should be driven vertically into the ground and the water pipe kept full. This may be facilitated by placing under a down spout.

The following rough list of the prices of lightning conductors at present prevailing in Salisbury may be of assistance :—

Complete rod and roof saddle with aigrette, 4ft. long, from 15s.

Copper tape, $\frac{3}{4}$ in. by $\frac{1}{8}$ in.—1 $\frac{1}{2}$ lb. per yd., at 1s. 6d. per lb.

Copper tape, 1in. by $\frac{1}{8}$ in.—1 $\frac{1}{2}$ lb. per yd., at 1s. 6d. per lb.

Saddles for tape, 3s. 6d. per doz.

Earth plates, 3ft. by 3ft. sq. by 1/16in.—28lb., at 1s. 4d. per lb.

Galvanised iron rope, 9/16in., 14s. per 100ft.

Saddles for same, 1s. 6d. per doz.

In conclusion, I would advise farmers to consult an engineer before putting up a lightning conductor on buildings of any magnitude, as the matter is fraught with risks. A badly designed or erected conductor is dangerous, and merely gives a false sense of security.

The writer has much pleasure in acknowledging his thanks to Mr. MacMuldrow, Consulting Electrical Engineer to the Salisbury Municipality, for much valuable information.

Plans and Specifications for Flue Curing Tobacco Barns.

The pamphlet containing plans and specifications for flue curing tobacco barns, published in December, 1910, being out of print, and the demand for the information contained therein being very large, the pamphlet is reprinted in this issue. The corrections to the specifications and quantities printed in a subsequent leaflet are embodied in the following particulars, while the original plan of a single flue curing barn has been altered so as to include an extra flue, by which addition a more even distribution of heat is assured. It will be seen from the plan that two furnaces instead of one have been included, and that these are built inside the barn.

The general custom at present in Rhodesia is to build the furnace on the outside of the barn, but we consider that the heat can be more economically applied if the furnaces are inside. Against this, it has been stated that the barn takes longer to cool when the furnace is inside, and this contention is to some extent correct. A barn with the furnace inside will take longer to cool down, but we consider the difference will be but little if a furnace of moderate dimensions is built. Many growers build their furnaces too large, and consequently the heat is retained longer than is necessary. We recommend that the inside measurements of a furnace built inside the barn should be: length, 5 feet; width, 2 feet; height, $2\frac{1}{2}$ feet. If these dimensions are not exceeded, we do not think the difficulty mentioned will be of any consequence.

The particulars given below refer to flue curing barns constructed for the purpose of treating Virginia leaf according to the approved process for the production of bright tobacco, but modifications to suit specific cases will no doubt occur.

However, the following details will serve to indicate what may be regarded as standard patterns of a barn and packing house :—

SPECIFICATION.—Clear the site of all rubbish and leave level. Dig the trenches for foundations 2 feet wide and 2 feet deep, or to such further depth as may be required to obtain a level and solid bottom. The sides of the trenches should be dug square. Build the foundations with the best stone procurable locally, in hammer-dressed rubble set and bedded in good dagga, all well bonded, and having no straight joints; no stones to have round faces, and no small stones to be used except where absolutely necessary for bringing surface up to true level. Foundations to be 2 feet wide by depth required by solid bottom, to finish not less than 6 inches above ground level at highest point. Flush up on completion, and well ram the earth to foundations.

On top of finished foundations lay a damp and ant proof course of 2 to 1 cement mortar 1 inch thick, laid truly level, or zinc with 6 inch lap.

In every yard of face-work there must be at least one through stone and at all corners.

Build the walls 14 inches to a height of 4 feet above the foundations and the remainder in 9 inch work with good hard well-burnt bricks, well bonded, set and bedded in 2 to 1 lime mortar or good clay dagga, all joints truly vertical and horizontal, every course well flushed up, and all outside joints to be raked out and painted in cement. No half-bricks to be used except where legitimately required for closers. All joints to be struck as the work proceeds. All crevices to be filled in.

The bricks for surface arch and the door and window arches must be rubbed down, and the latter arches must have a skew-back of not less than $4\frac{1}{2}$ inches. Build in all door, window, and ventilating frames, all secured with hoop iron.

In a double barn the dividing wall must be carried up in a similar manner to gable ends. Do all beam filling.

Put a 3 to 1 cement mortar weathering to top of foundations.

Construct the roof, doors and windows as shewn on plan.

Cover the roof with 24 gauge galvanised corrugated iron sheets 11 feet long each, free from corrosion or other defects. Iron to have a vertical lap of one and a half corrugations, to be secured to purlins with galvanised iron screws and galvanised iron and lead washers. Iron to fit close at ridge and against wall of lean-to roof. Cover the ridge with 18 inch galvanised iron ridging, fixed as specified to iron, and beaten down into corrugations of iron.

Put to the eaves $4\frac{1}{2}$ inches o.g. galvanised iron guttering fixed to fascias with proper bolts and tubes well soldered at joints. Put $3\frac{1}{2}$ inches diameter galvanised iron downspouts where marked R.W.P. on plan supplied, with proper bands and shoes.

QUANTITIES FOR SINGLE BARN.

Bricks	...	...	18,400 (say 20,000).
Corrugated Iron	...	...	20/11ft. sheets.
Wall Plates	...	...	4/17 $4\frac{1}{2}$ in. by $1\frac{1}{2}$ in.
Fascia	...	...	4/12, 2/18 6in. by $\frac{7}{8}$ flooring.
Inside Quartering for Centre and Wall Uprights	...	...	5/20, 10/16 3in. by 2in.
Inside Runners	...	...	15/16 $4\frac{1}{2}$ in. by $1\frac{1}{2}$ in., 20/16 3in. by $1\frac{1}{2}$ in. (intermediate rails).
Roof Timbers	...	...	5/19 (tie beams), 15/11 (rafters and struts) $4\frac{1}{2}$ in. by $1\frac{1}{2}$ in.
Roof Purlins	...	...	6/19 3in. by $2\frac{1}{4}$ in.
Gable and Ground Ventila- tors	...	...	7/12 $4\frac{1}{2}$ in. by $1\frac{1}{2}$ in. for framing.
Gable and Ground Ventila- tors	...	...	1/18 6in. by $\frac{3}{4}$ in. for panels.
Lintels	...	...	1/12 $4\frac{1}{2}$ in. by 3in.
Door Frames	...	...	1/15, 1/8 3in. by 3in.
Batten Doors	...	...	4/13 6in. by $\frac{7}{8}$ in.
T Hinges	...	...	2 pairs, 18in.
Barrel Bolts	...	...	2 6in.
Screws and Washers	...	...	3 gross $2\frac{1}{2}$ in. screws.

Nails	...	...	5lbs. 2in., 15lbs. 3in., 15lbs. 4in.
Ridging	...	...	5 lengths 18in. galv. iron.
Down Pipes	...	...	7 lengths 3½in.
Guttering	...	...	6 lengths 4in. half-round.
Bolts and Nuts	...	...	105 lengths 5in. by ½in. for inside timbering.
Cement	..	...	2 casks.
Pulleys for Ventilators	...	...	2 single, 2 double.
Cord for Ventilators	...	...	100ft. ¼in.

QUANTITIES FOR DOUBLE BARN AND ONE PACKING HOUSE.

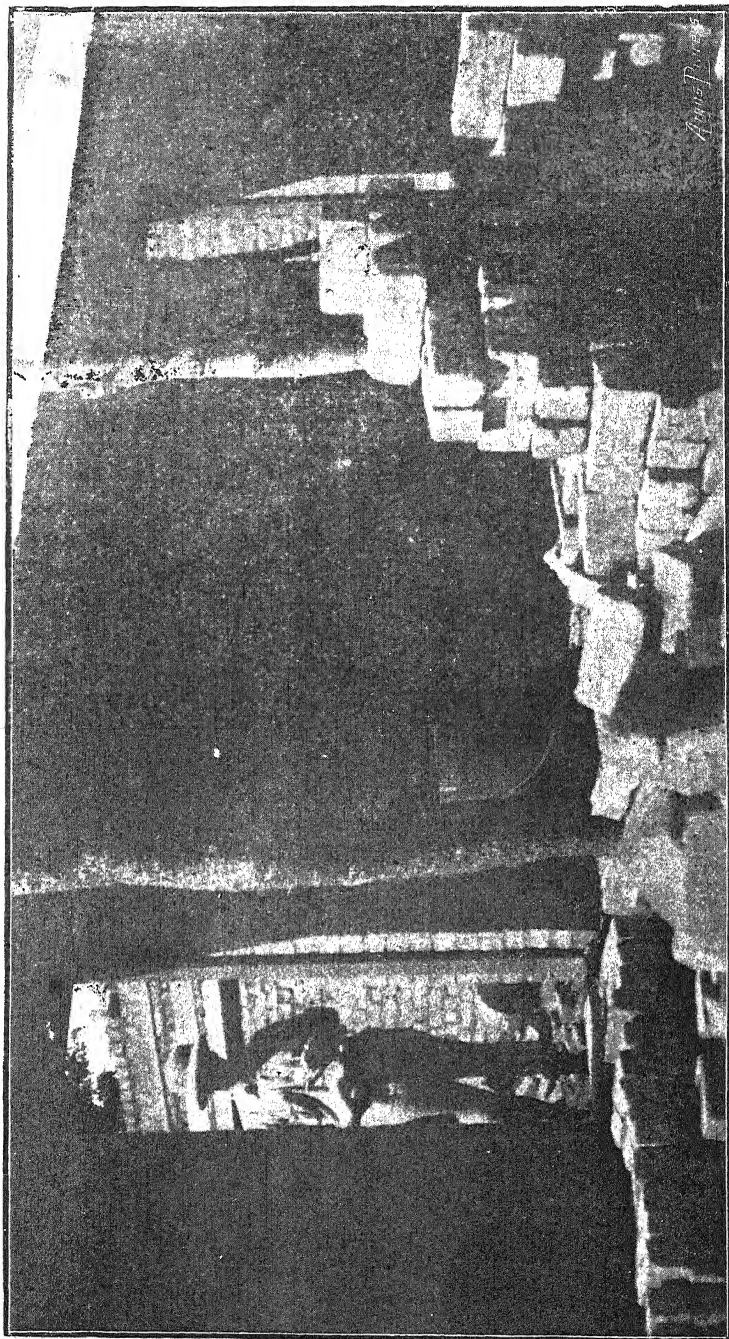
Bricks	...	...	56,000 (say 60,000).
Corrugated Iron	...	...	72/11ft. sheets.
Wall Plates	...	...	20/16 4½in. by 1½in.*
Fascia	...	...	4/12, 8/18 6in. by ¾in. flooring.
Inside Quartering for Centre and Wall Uprights	...	...	10/20, 20/16 3in. by 2in.
Inside Runners	...	...	20/16 4½in. by 1½in.
Inside Runners	...	...	40/16 3in. by 1½in. (intermediate rails).
Roof Timbers	...	...	15/19 (tie beams), 30/11, 15/15 (rafters and struts) 4½in. by 1½in.
Roof Purlins	...	...	430ft. 3in. by 2½in.
Gable Ventilators	...	...	7/12 4½in. by 1½in. for framing..
Gable Ventilators	...	...	1/18 6in. by ¾in. for panels.
Lintels	..	...	3/12, 1/18 4½in. by 3in.
Door Frames	...	...	3/15, 1/16 3in. by 3in.
Batten Doors	...	...	6/13, 12/8 6in. by ¾in.
T Hinges	...	...	5 pairs, 18in.
Barrel Bolts	...	...	8 6in.
Windows	...	...	2 8in. by 10in. 12 light American stock.
Screws and Washers	...	...	12 gross 2½in. screws.
Nails	...	...	10lbs. 2in., 25lbs. 3in., 25lbs. 4in.
Ridging	...	...	16 lengths 18in. galv. iron.

Down Pipes	...	...	21 lengths $3\frac{1}{2}$ in.
Guttering	...	...	24 lengths 4in. half-round.
Bolts and Nuts	...	...	210 5in. by $\frac{1}{2}$ in. for inside timbering.
Cement	..	...	8 casks.
Pulleys for Ventilators	...	...	2 single, 2 double.
Cord for Ventilators	...	...	100ft. $\frac{1}{2}$ in.

QUANTITIES FOR FOUR BARNs AND ONE PACKING HOUSE.

Bricks	...	...	83,400 (say 86,000).
Corrugated Iron	...	...	72/11ft., 22/10ft., 22/9ft. sheets.
Wall Plates	...	...	28/16 $4\frac{1}{2}$ in. by $1\frac{1}{2}$ in.
Fascia	...	...	4/12, 4/17, 4/18, 4/21 6in. by $\frac{7}{8}$ in. flooring.
Box Gutter	...	...	8/16 6in. by $\frac{7}{8}$ in. flooring.
Box Gutter	...	...	1/12ft. 3in. by $1\frac{1}{2}$ in. for bearers.
Box Gutter	...	...	4 lengths sheet zinc for apron.
Inside Quartering for Centre and Wall Uprights	...	...	20/20, 40/16 3in. by 2in.
Inside Runners	...	...	60/16 $4\frac{1}{2}$ in. by $1\frac{1}{2}$ in., 80/16 3in. by $1\frac{1}{2}$ in. (intermediate rails).
Roof Timbers	...	...	30/18 (tie beams).
Roof Timbers	...	...	50/11 (struts and rafters).
Roof Timbers	...	...	15/19 (struts and rafters, on small principles).
Roof Timbers	...	...	2/14 (valley rafters). All timbers $4\frac{1}{2}$ in. by $1\frac{1}{2}$ in.
Roof Purlins	...	...	610ft. 3in. by $2\frac{1}{4}$ in.
Ventilators in Gables	...	...	7/12 $4\frac{1}{2}$ in. by $1\frac{1}{2}$ in. for framing.
Ventilators in Gables	...	...	1/18 6in. by $\frac{7}{8}$ in. flooring for panels.
Lintels	..	...	6/12, 1/18 $4\frac{1}{2}$ in. by 3in.
Door Frames	...	...	5/15, 3/9 3in. by 3in.
Batten Doors	...	...	24/13, 12/8 6 by $\frac{7}{8}$ in. flooring.
T Hinges	...	...	9 pairs, 18in.
Barrel Bolts	...	...	12 6in.

Windows	...	...	2 8in. by 10in. 12 light American stock.
Screws and Washers	...	...	18 gross 2½in. screws.
Nails	...	...	14lbs. 2in., 40lbs. 3in., 40lbs. 4in.
Ridging	...	...	24 lengths 18in. galv. iron.
Down Pipes	...	...	35 lengths 3½in.
Guttering	...	...	36 lengths 4in. half-round.
Bolts and Nuts	...	...	420 5in. by ½in. for inside timbering.
Cement	...	...	12 casks.
Pulleys for Ventilators	...	...	2 single and 2 double for gable, and 4 double for roof ventilators.
Roof Iron for Vents. in Roof	2/10ft.	sheets galv. iron.	
Framing for Vents. in Roof	4/16	4½in. by 1½in.	



Unfinished barn, shewing furnaces built inside the barn.

The Domestication of the Elephant in the Congo.

It may not be generally known that the African elephant is used as a beast of burden in the Belgian Congo, and the following notes extracted from an article written by Commandant La Plume, appearing in the *Agricultural Bulletin* issued by the Congo Government, may be of interest :—

In 1899, writes Commandant La Plume, the Government of the Independent State of the Congo, having received a report from Fernand Vaz concerning the domestication of the African elephant, decided to endeavour to capture and employ the animal as a beast of burden. Being selected to perform this task, he arrived at St. Anne early in 1900, and there met Fernand Vaz, who had an elephant about 1m. 25 in height, very tame and working very well. The animal, he was informed, was caught by natives in a marsh after the herd had been dispersed. Commandant La Plume, after acquiring valuable information from Fernand Vaz, found himself in March, 1900, in the district of Uele, accompanied by five good native horsemen, and began the attempt at capturing elephants. To this end pits were dug at intervals of half a kilometre, the excavations being covered with brushwood. These early attempts were unsuccessful, several elephants, although captured, being strangled in the effort to get them out of the pits. In addition to pits, large enclosures were made, into which the elephants were driven; and by this means the party succeeded in capturing several animals, but they were too old to tame and were released. However, by 30th March, 1903, he had fifteen elephants of a suitable age.

Falling seriously ill, Commandant La Plume left the Congo and returned to Europe, leaving the work in the hands of Lieut. Willems, who at the end of 1910 had 35 splendid

elephants at Api. Lieut. Willems' method of capturing elephants was rather peculiar. Accompanied by a troop of horsemen, he would follow the spoor until he came up to the elephants, when the horsemen, by firing their guns, would alarm the herd, which stampeded, the older animals outstripping the young ones. The horsemen would then single out a young elephant, and, seizing it by the tail and ears, would impede its progress to the extent of allowing it to be lassoed. Some of the horsemen, armed with guns, would be reserved to drive off the older animals, which sometimes came back to the assistance of their young. It was, however, very seldom that recourse was had to the guns. The captured elephant, if he did not struggle too much, was taken to the domesticated beasts which followed the chase. He usually followed his companions to camp; but, if he proved recalcitrant, two older elephants were detailed to bring him along. Very often a captured elephant proved amenable by being given green stuff, carrots, bananas and water. Upon arrival at the camp, the captured elephant was set at liberty to graze with the tame animals, although a rope was tied round his body so as to make it easy to capture him quickly, should he attempt to escape. In Uele, the hunting season comprises the period from the end of November or December until July. The hunting party is sometimes away from camp for two or three months.

The early attempts at domesticating elephants were of course a laborious and difficult matter, but now that there are a number of animals tamed the task is much easier. A captive is attached by the neck to an old elephant by ropes, and it is very seldom that by the end of two or three days he does not march with his companion and perform his duty; but it is not advisable to try his patience by working him too much or making his task disagreeable. On return to camp, he is always rewarded with some sweet potatoes, bananas or manioc.

At Api the elephants perform all manner of work. Some pull the plough, others haul wagons, and some are employed to make and improve roads, the animals being driven by natives. The African elephant, it is stated, is without doubt as intelligent as his Asiatic confrere, and all the work performed by the latter can be done by him.

The mortality among the new captives is regrettable, but it is equally as great in India. Spinal disease occasionally breaks out among the elephants, but by close attention and isolation the disease may be arrested. Redwater has been observed amongst them, all cases proving fatal. The elephants are housed during the rainy season in well-ventilated stables built of brick, in the erection of which they materially assist; but they sleep outside in dry weather.

The elephant in his natural state usually covers himself with mud after taking a bath, but at Api the animals are prevented from rolling in the mud, and consequently are of a handsome greyish colour. It is worthy of note that the elephant that works daily is in much better condition than the one which goes to pasturage only. When working, his muscles get bigger and he is much more docile.

There are thirteen illustrations in Commandant La Plume's article, shewing the elephants in the kraals at Api, bathing, hauling wagons, carting bricks used for the construction of their stables, pulling ploughs, etc.

Dry Land Pastures.

The Johannesburg "Star" of 28th October contains a summarised report of a valuable address on "Pastures for Dry Land" delivered by Sir Percy Fitzpatrick at the Dry Land Farming Congress held in Bloemfontein.

In the course of his lecture, Sir Percy said that, in regard to the growing of grasses, nobody could lay down fixed rules. What was good for one district was not good for another. A success of the grass grown could be made in one part of the farm and a failure in another. All that he could do was to suggest certain lines on which his listeners could make their own experiments. He hoped they would not be extravagant, as he had been; they should begin in little things, and they should not be discouraged if failure followed their footsteps. Neither should they be guided by a failure or a success until it had been checked. In experimenting with a grass it had always been his aim to strive to obtain a grass which would stand rough treatment. It should not be forgotten that those who were endeavouring to grow grasses were trying to put down a permanent pasture, and it was, therefore, right to take as much trouble with it as was taken with their wheat or potatoes, which, after all, lasted only a year. The grass would be permanent and not for one season alone. He believed in going in for thorough preparation, and rather to go in for a small lot to start with and to do that well. At Harrismith, where he had laid down over 2,000 acres in grasses, there was no irrigation whatever, but there was a good rainfall.

Sir Percy Fitzpatrick proceeded to deal at length with the various kinds of grasses which he had found most efficient. He said that *paspalum dilatatum* was the best drought resister in summer—a summer grass; and *phalaris bulbosa* was the best frost resister for winter. Tall fescue he considered the best all-the-year-round grass, as both drought and frost resister.

As regards soil, Sir Percy said in all cases he had found new ground better than old ground, for the former is, as a rule, free from weeds.

Touching on what the various grasses would do, Sir Percy said that the rainfall of Harrismith was a good one, and had been as follows for this year :—January, $2\frac{1}{2}$ inches; February, 11.18; March, 2.1; April, 4; May, $\frac{3}{4}$; June, 1-6; July, 1-10; August, 1-100; September, 1-5; and October, $\frac{1}{2}$. From May to October there had been no rain which could do any sort of good at all. To-day, however, his sheep, horses and cattle were feeding on paspalum which had grown during the spring with no rainfall at all. The cattle were improving, and the grass was also improving, notwithstanding that a severe drought had been in evidence for some considerable time past. There could surely be no better testimony to the efficacy of the grass than that. Whether the paspalum would last another month under drought he was unable to say, but that was the position to-day. Some of the paspalum mentioned was two and some three years old; a smaller lot was four years old. In a paddock of 150 acres on his farm at Harrismith, which had previously been as bare as the floor, little shoots of paspalum had begun to come up in the first week of August, and the sheep were nibbling them off. In the same paddock of 150 acres, 100 head of cattle were now grazing, and had been there for the last month, and both cattle and grass were improving.

Sir Percy said that he had noticed the *phalaris bulbosa* grow an inch a day, but after the shoots had reached 6 inches they grew very slowly. He therefore started his sheep feeding off them, and he found that the best plan for such areas was to feed off them and never let them grow up. In June, 1911, on the same paddock of 150 acres, on which the seed had been sown the previous month, a tremendous lot came up with the September rains, and it was growing all the time till January. At the beginning of January it was growing so luxuriantly that 90 yearling heifers, 20 cows, 23 mules, 60 mares and foals, and 40 oxen and odd horses which were about the place were let in to graze. They fed on that pasture for six weeks, and even then the grass could not be kept down, but went to seed. This meant that 240 head of big stock had been grazing for six weeks on a plot of land of 150 acres which was only four months old in pasture, the grass of which could

not be kept down. In a plot of 300 acres, divided into four camps of 75 acres each, 100 horses, 92 cattle, and 840 sheep had thrived splendidly. In one of these camps of 75 acres, 201 sheep were put on to feed after the big lot were removed. They fed there from September to the 1st of January, and the grass was still growing well. The paddock rested from the 1st of February to the 26th of April, and then 492 sheep were let in during May, June, August, and half of September. Before the ground had been put under grass it would not have carried one sheep, but it was now feeding nearly 10 sheep to the acre.

As regards the *phalaris bulbosa*, Sir Percy said that the three-year-old plants yielded a bundle of green forage twice between March and November, but, of course, that grass was cultivated and fertilised. The animals were not so fond of this grass as they were of other grasses, but it was excellent feeding. He was of opinion that the grass should never be allowed to grow up. It should, of course, be taken care of, but the best thing was to feed it off as soon as it put its head above the ground and then some return would be got from the animals feeding on it. Speaking about the tall fescue, Sir Percy said a paddock of 70 acres had been set aside on his farm, two-thirds of which was fescue and the rest burnet and cocksfoot. In the paddock 900 sheep fed for May, June and July of this year, and they got fat on it. The soil was good, but not the best in the world by any means, and the grass was only fifteen months old.

Sir Percy also mentioned the use which would be made of winter green grasses for fire protection. A mixture of tall fescue and lamb's tongue sown in a strip 60 yards wide round a plantation or bordering a paddock would give perfect protection from devastating grass fires, and save the annual trouble and risk of applying and burning a fire line.

In regard to fencing, Sir Percy said that *paspalum* sown in the spring with mealies on new ground, where cultivation over weeds was necessary, was not a bad way of doing it.

South African Irrigation Congress.

Mr. W. Martin Watt, Agricultural Engineer, who was deputed by the Administration of Southern Rhodesia to attend the Congress of the South African Irrigation Association at Oudtshoorn, reports as follows :—

The Congress opened at 10 a.m. on Tuesday, 8th October, and closed its proceedings about midday on Friday, 11th October. Much regret was felt by all delegates that their President, Sir T. W. Smartt, M.L.A., was so indisposed as to be unable to take the chair. Mr. E. T. L. Edmeades was nominated chairman in the absence of Sir Thomas, and carried out this duty throughout the proceedings. Sir Thomas Smartt was sufficiently recovered on the second last day of the proceedings to be able to attend, and his advent was greeted with most hearty applause.

Owing to the President's indisposition no presidential address was given, and after formal business was gone into and concluded, Mr. K. A. Carlson, Conservator of Forests, Orange Free State, read a very interesting paper on "Forestry in relation to Irrigation in South Africa." In his paper Mr. Carlson pointed out that forests exercise their influence on wind, temperature, evaporation and precipitation on the condition, composition and movement of soil, but, above all, on irregular stream flow. Mr. Carlson contrasted the different effects of grass and forest in reducing the rate of run-off, and this, much in favour of the forest, owing to the canopy of trees breaking the force of the rainfall and preventing the rain from mechanically hardening the surface soil. Further, he pointed out that where grass is dense the roots tend to form a dense mass, and so compact the soil as to prevent any but very heavy and continuous rains from penetrating to the sub-soil. In the case of forests, he stated that the rain is conducted

firstly from the foliage and stems to the ground, where it encounters a thick layer of humus formed by fallen leaves, pine needles, etc.; and that, owing to the fissures formed by the tree roots and to the porous nature of the surface, it can find its way under the most favourable conditions by subterranean crevices to replenish and regulate the supply of water to the springs and streams below. Mr. Carlson pointed out that the evaporation from a forest soil without leaf mould is 53 per cent. less than from a soil in the open, and that from a forest soil with a full layer of leaf mould is 78 per cent. less than in the open. Mr. Carlson also pointed out the value of forests in increasing the rainfall owing to the fact that they induce a lower temperature in summer and transmit a certain amount of moisture to the air, thereby attaining the saturation point more readily. He further pointed out the value of forests towards checking the great evil of corrosion, to which arid and semi-arid countries are so liable, by their effect in checking rapid run-off. A final argument which Mr. Carlson brought forward was, that in addition to all these benefits, the afforestation of a country, its mountain slopes in particular, is a great national asset. In the future there is sure to be a great wood famine; the price of industrial timber has increased enormously within the last 20 years, and the writer heartily agrees with Mr. Carlson on the principles he so ably put forward to the Congress, and in doing so has this Territory particularly in mind. Enormous quantities of indigenous timber are being cut down by miners, natives and others, and next to nothing put in to replace this devastation.

There was a great deal of discussion upon Mr. Carlson's paper, but most of this drifted somewhat away from afforestation, and dealt chiefly with the danger of burning the indigenous grass, scrub and trees. The general consensus of opinion was that burning the veld was against the interests of the whole farming community.

Another very interesting paper was read by Mr. Kanthack, Director of Irrigation, on "The Financing for Irrigation Schemes." This paper consisted of a timely warning to farmers regarding the large prices paid for land that is not now irrigated, but that has irrigation possibilities. Mr. Kanthack pointed out that the cost of constructing the proposed irrigation

scheme, together with maintenance, fencing and preparation of the lands, interest on capital laid out and redemption within a period of not less than 20 years, should be added to the cost of the land, and that in estimating profits these should not be based upon such fancy products as ostrich feathers, calabash pipes, etc., but on staple products such as beef, mutton, pork, bacon, wool, cereals, etc. The period for redeeming the capital outlay (whether borrowed capital or not) Mr. Kanthack limited to from 10 to 30 years, and the latter period only for works of considerable magnitude and permanency. In estimating for pumping plants, the maximum period of redemption should not exceed 10 years.

In the discussion that followed, several farmers objected to Mr. Kanthack suggesting that they should not base their estimates on ostrich feathers, and argued that there was no likelihood of there ever being a serious or permanent slump on the present market value of that product. The general feeling of the meeting seemed, however, to be fully in accord with Mr. Kanthack's address, and personally I think his remarks throughout were well timed. In estimating profits from an irrigation scheme, especially in a new country such as Southern Rhodesia, farmers and engineers will be well advised to use great caution and not to estimate on fancy products or unnaturally inflated market values. Should the estimated profit 20 years later prove to have been too low, this is surely more satisfactory than to find it to have been too high.

Forty-three prize essays were submitted to the judges upon "The Distribution of Water," having regard to the character of the water supply, the character of the soil to be irrigated, and the surface conditions and slope of the land. Ten of these were selected for final consideration, the winning essay being that under the *nom de plume* "Aquator." Many of these essays were of a very high order, but, while shewing that the competitors had an intelligent and practical knowledge of the subject, nothing new or of any special interest was brought to light.

Several motions were submitted, but the only one of any particular interest was that of Mr. E. T. L. Edmeades of Oudtshoorn. The motion submitted was :—

“That in the opinion of this Congress legislation should be enacted to protect existing irrigable land against land capable of being irrigated, and that flood water should not be stored until the requirements of existing irrigable land shall have been satisfied.”

There was a long and somewhat heated discussion upon this motion, which was ultimately, upon being put to the meeting, defeated by about 34 votes to 22. It was practically a case of Oudtshoorn district *versus* the rest of the Union of South Africa, or upper proprietor *versus* lower proprietor. Mr. Kanthack pointed out that the Bill as it now stood, while by no means perfect, provided safeguards for the subject matter of the motion, and that the whole intention of the Union Irrigation Bill was to get the most beneficial use of the waters of the country, while, at the same time, safeguarding existing rights.

The greatest hospitality was shewn to the visiting delegates. A huge picnic to the famous Congo Caves was one of the most enjoyable, and after the most adventurous of the delegates had gone the rounds of their wonderful and fairy-like labyrinths, all (about 250) sat down to a most munificent luncheon. The journey to and from the caves was covered chiefly by motors, and the scenery along the route was greatly appreciated. Mrs. Gert Olivier entertained the delegates to a garden party, and they also were invited to a special bioscope entertainment. In addition to this, the delegates were made honorary members of the Oudtshoorn Club and Golf Club during the period of their stay.

Importation of Pedigree Stock from Great Britain.

The following are the terms under which the Union-Castle Company undertake to convey pedigree stock from Great Britain to South Africa, free of freight :—

In order to assist in the agricultural development of South Africa, the contractors undertake to carry free of freight in their mail or intermediate ships or other ships to be named by them, from the contractors' berth ports or other ports in Great Britain, at their option, to the contractors' usual ports of discharge within the Union of South Africa and to Lourenço Marques, pedigree stock, *i.e.*, stallions, mares (excluding race-horse mares), bulls, cows, boars, sows, rams and ewes, intended for breeding purposes. The pedigree stock in question must duly appear in the stud, stock or herd-book of the Royal Agricultural Society or other registered public association approved by the High Commissioner for the Union in London, whose certificate of approval of such association shall be accepted by the contractors. On making application to the contractors for free conveyance, the applicant shall supply a pedigree of each animal, signed by the breeder and duly attested by at least one credible witness and certified by the authority of the stud, stock or herd-book in which the animal is entered, provided that the Department of Agriculture for the Union shall have the right to exclude from the benefits of this clause any animal or animals, even though possessing the prescribed pedigree, through the High Commissioner, before shipment if they desire to do so.

The term "free of freight" in the preceding paragraph shall include accommodation and supervision equal to those now supplied by the contractors for stock on which freight is paid, but shall not include food, which must be provided at the cost of the shipper. The stock shall be carried at owner's risk from f.a.s. until landed at the port of destination.

As a condition of the foregoing undertaking by the contractors, it is agreed that the stock in question shall not be removed after their arrival within the territory of the Union of South Africa to any place or country outside the limits thereof during a period of not less than three years, nor shall such stock be re-exported overseas. The Government shall make such regulations as may be necessary to secure the due fulfilment of these obligations, whether by requiring the registration of stock carried as aforesaid or otherwise. It is understood that Bechuanaland, Swaziland, Basutoland and other native territories are not to be included in this Agreement unless and until they are incorporated in the Union of South Africa. In the event of stock carried as aforesaid being exported or removed from within the Union during the period of three years named above, then the shipper and/or consignee of such stock shall pay to the contractors such sum as would have been payable for freight of any stock not being pedigree stock. In no case shall the contractors be required to carry stock in any ship in excess of the numbers permitted by H.M. Board of Trade, and the contractors shall not be under any obligation to carry cattle from any continental or other ports if by so doing the ships would be prevented by the regulations of the British Government from calling at any British port, or if thereby the ships would incur restrictions or difficulties at any British or other port.

In the event of stock being offered in excess of what the ships of the contractors can carry they shall be at liberty to carry it by any other ships, but in this case the obligation to carry it freight free shall only be binding upon them in the case of sufficient stock—say 150 head—being offered for shipment at one time from one berth port to one South African port, and upon sufficient notice being given of such requirements, so as to enable them to charter outside tonnage at a reasonable rate.

Tobacco in Nyasaland.

The Report of the Director of Agriculture of the Nyasaland Protectorate for the year ended 31st March, 1912, contains the following :—

The year under review was unfavourable for cotton, but permitted the planting of tobacco late into the season, with the result that, both in point of poundage and value, it was our leading crop. With regard to climatic conditions, it was proved that continued dull weather, although detrimental to quality of tobacco, is not fatal to poundage returns, as with cotton, but, on the other hand, cotton withstands drought much better than tobacco. These points are worthy of consideration, and should induce planters to sow both crops in such proportion that success in one will compensate for partial failure in the other. The acreage under tobacco in the Protectorate was 4,507 as compared with 3,274 in the previous year, and the exports of cured tobacco for the year under report amounted to 2,146,615 lbs., which was valued locally at £53,689, shewing an increase in the exports of this crop to the local value of £11,062 18s. 3d. or 441,978 lbs. in weight. The crop at present being harvested covers an area of 7,411 acres. Judging from the reports of experts, it could not be considered on the average a good year for quality, and no doubt this can justly be attributed to a marked absence of sunshine to mellow and ripen the crop; there was therefore a considerable quantity of leaf which shewed up green after curing, and on the average the crop also lacked body, which tells against the weight. From conversation with some leading brokers in London, I formed the opinion that good ripe Mahogany, with body, was in greater demand than thin bright leaves of good colour for cigarette manufacture.

No supply of Virginian tobacco outside the American crop is attracting so much attention as our local product, and this can be readily understood, when one realises that our crop of over two million pounds is a considerable factor in the tobacco market, as the total weight of tobacco cleared for consumption

in the United Kingdom during 1911 was 91,594,642 lbs. ; it is therefore seen that the Nyasaland crop for the year under review amounts to over two per cent. of the whole. I understand there is some difficulty in getting manufacturers to try Nyasaland tobacco as a constituent for mixtures, but I was assured that our tobacco was as good, if not better, than Virginian on an average, and that firms who had given the tobacco a fair trial, in the majority of cases, had placed larger orders with brokers this year than last.

It is quite reasonable, though perhaps not patriotic, that manufacturers or tobacconists who produce a certain type of mixture are not willing to risk losing customers by introducing Nyasaland tobacco as a substitute for Virginian grown, when they can purchase the class of tobacco they have been accustomed to use at the same cost. It is always a difficult matter to introduce a staple from a new country into a market which for years has drawn its supplies from one or two recognised centres of production, and our cotton, tobacco, and tea are all in this position. Their future success on the home market depends largely on the care with which we conform to the requirements of the home buyers. People in new countries have an erroneous idea that buyers are waiting expectantly for their crops, whereas the truth of the situation is that brokers frequently have to use tact and persuasion to get manufacturers to test the value of such products. When in London I examined our tobacco in the Customs sheds, and compared it with Virginian grown, which, unlike ours, is mostly exported in barrels. The opinion I formed was that the only Nyasaland tobacco in bales which compared with the American packing was put up in small bales of 2ft. 6in. by 2ft. 6in. by 2ft. approx. The large bales which had been pressed in a cotton baler were in a very mutilated condition, the ends being bagged into pockets full of broken leaf and tobacco dust. It is generally known that the moisture content should not exceed 12 to 13 per cent., and on good authority I believe that some consignments of Nyasaland tobacco exceeded 20 per cent. It will be readily understood that as duty is paid by weight, manufacturers are not inclined to purchase tobacco containing 20 per cent. moisture, as they have to pay duty on the extra water. It was also pointed out that tobacco packed in double canvas was better than when paper and canvas are used.

A Note on Malaria.

By A. M. FLEMING, C.M.G., M.B., F.R.C.S. (Edin.),
D.P.H. (Camb.).

The approach of the rainy season, with the consequent increase in the numbers of insect pests and especially the *Anopheles* mosquito, makes it incumbent on all settlers and farmers to guard themselves and their families, so that they may as far as possible avoid malarial infection.

It is folly to suppose that because no mosquitos are noticed they are necessarily absent altogether. One is so frequently told, "Oh, we don't need to use a mosquito net; we have no mosquitos here." And yet a systematic search will in nine cases out of ten produce mosquitos or their larvæ, and, in these cases, most often *Anopheles*.

The common domestic mosquito, the *Culex*, which is harmless as far as malaria is concerned, is more pertinacious and unpleasant than his harmful brother, the *Anopheles*, and when he is absent, as is not infrequent in many parts of the country, the individual is apt to delude himself that he is secure, and to scorn precautions. In fact the advent of the *Culex* is often a blessing in disguise, forcing the settler to take precautions for his comfort which he would not otherwise take for his safety.

From December on, persons in malarious districts should commence also the practice of taking prophylactic doses of quinine. Precautions for the prevention of malaria and instructions as to its treatment have been issued in pamphlet form by the Government. These have been sent to most of the farmers and settlers, but those who have not received them or desire fresh copies can get them at any time on application to the Agricultural Department, the Medical Director's Office, or the Estates Department.

The Fly Pest.

VARIOUS METHODS OF COMBATTING IT.

The following notes by the Director of the Port Elizabeth Museum, appearing in *The Farmers' Weekly*, may be helpful to our readers :—

The only satisfactory way to attack house flies is to remove the substances in which they breed. These are manure heaps, filthy rubbish boxes, decaying vegetation in gardens, decomposing animal matter and other kindred substances. Stable manure, however, is the source of 90 per cent. of flies. In the house the various fly papers should be in constant use during the fly season. If the window and door are closed and twenty or thirty drops of carbolic acid is sprinkled on a hot shovel or piece of tin to cause it to evaporate, it will kill all the flies in the room. Bichromate of potash in weak solution with a little sugar, placed about the rooms in shallow vessels, will be sucked up by flies and poison them.

Stable manure and other decaying refuse should be sprinkled two or three times a week with chloride of lime, or a solution of carbolic acid, viz., a teaspoonful of the crude acid to a pint of water. Another plan is to mix a quart of paraffin with an ounce of carbolic acid and sprinkle a little over rubbish heaps, dust bins, etc. This kills the eggs and fly-grubs, and keeps off the mature insects. A two per cent. solution of formaldehyde sweetened with sugar, and a little milk added, and placed in saucers or plates in rooms, is greedily sucked up by flies. This poisons them immediately, so that their bodies may be seen lying around the vessel. This not only kills flies, but also destroys the disease germs inside their bodies. It should be renewed daily. Screening the windows and doors is, however, the most efficient and permanent way to exclude flies from houses.

SOME AMERICAN METHODS.—Prepare a solution of 15 parts of commercial formal, 20 parts milk, and 65 parts water to be placed in saucers. The flies will be attracted by this if nothing in the food line is left about the place, and it will prove a most effective poison for them.

Another remedy is as follows :—Heat a shovel and pour 20 drops of carbolic acid on it. The vapour kills the flies.

Still another :—Place a piece of bread on a plate and pour over it a mixture containing two teaspoonfuls of formalin, a half pint of milk, a half pint of water, and a teaspoonful of sugar. The bread attracts the fly and affords a place on which to alight and feed.

For manure beds :—Sprinkle with chloride of lime two or three times a week, or use a solution of crude carbolic—a teaspoonful to a pint of water.

For dust bins :—A little common kerosene mixed with crude carbolic acid (1oz. acid to a quart of kerosene). This keeps the flies away and kills the eggs and grubs already there.

Remember, if there were no refuse there would be no breeding ground, and consequently fewer flies. Kill them in thousands before they have time to evolve from grubs to flies.

Sprinkle all window ledges with some well-known fly-killer powder—the flies will powder their feet with it, they will be unable to stick to the glass, slipping again and again into the powder until they die.

A weak solution of formaldehyde, two per cent., sweetened with sugar and coloured with milk, poisons the flies that drink it, either immediately or so that they die close to the fatal cup, and may be swept away. This also destroys the disease germs within the fly.

The drug must not be stale, and as it quickly evaporates there must be a fresh solution every day.

A handy fly trap :—Make a trough of tin three-quarters of an inch wide and of the same depth, and as long as the width of the window. Place this close against the window on the inside, and keep it filled with paraffin. The fumes will over-

power the flies as they approach the window, and they will drop into the tank. Fly papers and fly traps should be set about in likely places.

HINTS AND SUGGESTIONS.—In conclusion, here are some hints and suggestions issued by municipal sanitary departments :—

Keep your house and your yard or garden clean.

Do not allow dirt to accumulate.

Let there be no breeding place for flies.

Keep all receptacles for refuse tightly covered.

Sprinkle the refuse with chloride of lime.

Screen your windows and doors.

Screen all your food and drink.

Screen your baby's bed.

Burn pyrethrum powder.

Kill the flies as fast as they appear.

Kill them with liquid poisons, with sticky fly papers, and in traps.

No good housewife should tolerate flies in her house any more than she would other vermin.

Look to your food. Keep your pantry and kitchen scrupulously clean, sweet and well aired, and keep the food covered.

There should be a building law to force people to erect kitchens and pantries which are thoroughly hygienic.

Flies must be kept out of the house. The screens will minimise them. If, in spite of all precautions they get in, they must pay the death penalty.

Leave nothing about the kitchen or dining-room that will attract them, except the liquid poisons intended for their death warrant.

Review.

South African Insects and other External Parasites of Man and Domesticated Animals, by William Moore, B.A.,
Lecturer in Entomology, School of Agriculture,
Potchefstroom. (Horticultural Publishing Co.,
Johannesburg; 3s. 6d.)

We welcome the appearance of this little handbook, described by Mr. F. B. Smith, Director of Agriculture in the South African Union, as "the first of what is hoped will be a long and useful series of publications emanating from the Agricultural Schools recently established in this country." The book is intended primarily for the use of agricultural students as a ready means of determining injurious insects included in the scope covered by the title, but it is hoped that it will also be of use to the more advanced farmers. The results of the research work done in South Africa are scattered through the various Agricultural Journals and other publications, and the need for a compilation of this description is obvious. Mr. Moore has handled his subject well, and by discarding everything not absolutely essential to his purpose has managed to condense a large amount of information into a very small compass. The pests are arranged under the headings of the animals they attack, an arrangement to be commended on the score of ready reference. A glossary of entomological terms at the end of the book will be found helpful.

The book is freely illustrated, but unfortunately the quality of the illustrations is very uneven, and most of the original figures, both drawings and photographs, leave much to be desired. This is a great pity, as good figures are essential to a work of this kind. There is one serious omission, which extends from cover to cover: the author has neglected to give any indication of the natural size of the insects figured. There

are other points which call for criticism. The chapter on "Household Insects," though very useful, hardly seems to come within the scope of the book, as we interpret the title. It also seems difficult to explain why the Mediterranean flour moth should be the only larder pest discussed, with the exception of ants. Other omissions might be mentioned.

Criticism is, however, easy, and we do not doubt that in spite of imperfections many besides agricultural students will benefit by the useful advice to be found in the pages of this little volume.

Correspondence.

POULTRY IN RHODESIA.

To the Editor,

Rhodesia Agricultural Journal.

Sir,

Having read very carefully through the contributions of "Gallinule" upon "Utility Poultry Keeping," I regret feeling myself disappointed in that the modesty of the writer forbade him signing his name. I take it from your editorial note (p. 311, No. 3, *Rhodesia Agricultural Journal*) that it was modesty—and modesty alone—which influenced the author to adopt the pseudonym "Gallinule." Had he signed his name, it would have enabled old settlers in the country to glean whether his remarks were the result of experience gained in this country, or whether they are an anthology culled from the numerous works upon poultry—and their name is legion—of Great Britain, France and America.

When "Gallinule" emphasises the necessity of patience, I agree, yet there are a few things worth remembering. First, that fowls as we now know them have never been subjected to the test that we are giving them in this country; and secondly, we must neither forget nor ignore the work done by the Portuguese, who for upwards of three hundred years have tried to acclimatise birds of Mediterranean origin in this country, which efforts have always resulted in complete failure. Not only were birds brought here from the Mediterranean littoral, but also from Feira, the slopes of the Serra da Estrella and elsewhere in the province of Beira in Portugal.

The *Gallus Bankiva* is not fertile in India at much above 3,000 feet; it then is replaced by the *Gallophasis*, and this in

its turn is replaced by the Phasianus. The range of these birds is in Northern India. Coming to the South, we find the *Gallus Sonneratii*, which at different altitudes presents two varieties, so strongly marked as deserve the name of different species. The attempt to acclimatise fowls of English or Mediterranean breeding in the Northern Deccan was given up long ago, the altitude being from 3,000 feet upwards.

After very careful thought, I have come to the conclusion that "Gallinule" has not had much experience in this country. I may be wrong, but I certainly expect of anyone writing as he has, to adopt and conform with the demands he makes upon others (pp. 334-6, No. 3, *Rhodesia Agricultural Journal*); and if he had had experience in this country he most certainly would have noticed the external morphological variations easily apparent from the fifth generation of fowls hatched here, and which undoubtedly begin in the first generation, but it would require a very expert eye to notice the variations at that early stage. I have carried out an experiment with Black Minorcas and Plymouth Rocks extending through thirteen generations, with the object of acclimatising fowls. It finished abruptly at the thirteenth generation; not that I was tired of the experiment—I would have continued until the birds became quite sterile—a troop of leopards wiped them out. As my experience entirely agrees with that of the Portuguese, I shall not repeat it, being convinced that we shall not establish a type of bird by any importations we may make. The path to that consummation lies in the breeding from the small indigenous fowl and selection.

It may be objected that this is a slow process. To which I may reply that there are not any short cuts to success in breeding, especially under the conditions obtaining in this country; and I may point out that Bakewell's and Conway's experiments were "slow." It took Colonel Dexter thirty-six years to establish the type of Dexter-Kerry breed of cattle, and it has taken over a hundred years to bring the Indian cattle to their present excellence; and here I may remark that the importation into India of stock, whether of hair, wool, or feather, for the purpose of improving indigenous fauna, has always resulted in failure.

Without describing the difference in the measurements and weights of the bones of fowls, which would be attempting an absurd and misleading accuracy, the general alterations may be taken as follows :—

The birds become conspicuously smaller, beaks more elongated, nasal apertures larger, and likewise a greater development of the lungs, orbits become larger and closer together, legs longer, neck longer, breast flattened, and in the case of Plymouth Rocks the feathers become almost black. The skin becomes darker, and the legs of Plymouth Rocks a blackish yellow. Internally, the flesh cells become larger, and the fat undergoes a great alteration; at the ninth generation the fat is as widely different from that of the imported bird as is the fat of indigenous cattle of this country from the fat of cattle bred in Cape Colony or any other temperate zone. At the same time there is a decrease in fertility, which the introduction of healthy male birds fails to arrest; not only are the eggs fewer in number, but still fewer are fertilised. A *post-mortem* examination of the hen will afford an explanation, but we have not to wait for a *post-mortem* of the male bird to observe a rapid decrease of the fertilising element. It is the same with pigs and dogs.

Whilst I fully agree with "Gallinule's" undisguised contempt for sciolism (p. 689, No. 5, *Rhodesia Agricultural Journal*), I fail to see why he should object to the word "metabolism." I can find no better word to express the change, and changing attributes of exotic plants, birds or animals, when brought to the altitude of Rhodesia, and therefore subject to the strongest chemical rays of tropical light. When we realise that the effects of tropical light and the emanations of radium are different in degree only, and not in kind, upon a white skin, no matter what colour the hairy or feathery covering may be, we shall also realise that the physico-chemical changes are of the utmost importance, and can only be expressed by the word "metabolism" in writing or in speech.

It is somewhat useless to enter upon the subject of feeding, while imported animals and birds are in an unstable condition; it will not be settled by a mathematical equation. I was glad to read the emphatic remark of Mr. Bevan that feeding was no mechanical process; and is it not time that we

should cease to be troubled by the publication of tables of food values? The food being grown and produced in other countries, the ratios do not—nay, will not—obtain here. The seed, from its germination to growth and subsequent development of the plant, is influenced by the chemical effects of tropical light; physico-chemical changes in the plant are altered, and the resulting seed is different. As it appears that one of the effects of tropical light is the formation of alkaloids, it almost follows that under adverse seasonal conditions the pasturage may become poisonous.

I suppose that most of the people engaged in farming in Rhodesia have studied to some extent natural history? If so, they will have learnt that all animals, including man, become smaller as they approach the equator. This also includes birds. After fifteen years' farming life in this country, I am beginning to perceive—although, at present, as in a glass darkly—the beneficial effects of such natural selection.

I am, etc.,

MATTHEW W. WHITE.

Dixey Farm.

REPLY.

There are a good many points in Mr. White's letter with which I fail to agree, and of these the most outstanding is his statement that "fowls have never been subjected to the test we are giving them in this country."

I take it that Mr. White refers to conditions of temperature, humidity and altitude; at least, he refers again and again to the last of the three. It is of course certain that our average altitude of 3,000 to 4,000 feet above sea level has some influence upon our poultry, but I am altogether of opinion that the factor of elevation is a beneficial one. The finest birds I ever owned were bred at an altitude of nearly 5,000 feet, and that for six or seven generations. Mr. Ronald Weir of Quito, South America, the altitude of which is three times that of Mr. White's farm, kept Andalusians there from 1887 to 1896 with great success, getting an average of over 180 eggs per hen per annum, and breeding birds in no wise inferior to

his original stock. But then Mr. Weir did his work himself, instead of leaving it to be done by others. The latter is the case in far too many instances of ill-success, whether they occur in South America or South Africa.

Perhaps Mr. White can give me the names of a poultry-man or two who have really tried to acclimatise fowls in the Northern Deccan and have failed. I am confident that, if I can get into communication with those who have so failed, very little cross-examination will shew that there were a host of reasons for failure other than altitude.

I have it upon the authority of the Rev. Mr. Blacklock, of the American Presbyterian Mission, that good Leghorns have been bred for many years at hill stations in both Northern and Southern India.

The statements touching *Gallus Bankiva* (the wild jungle fowl) and the pheasant prove nothing, and are not, I take it, based upon Mr. White's own knowledge. They seem to me to smack over-much of the hasty generalisations of the writers of popular works on natural history. Mr. White's own experience is more to the point. He gives us certain data which may be of value to others who attempt to follow in his steps. I myself have noticed the tendency towards elongation of the beak and enlargement of the nares in fowls running at large and breeding promiscuously, but never even in much higher altitudes than 4,000 feet amongst carefully selected birds. Not a single point of deterioration mentioned by Mr. White but can be put down to neglect of rigid selection in breeding—or, as in the case of flesh and fat, to careless feeding—and I should like to have an answer to the following questions before condemning our climate on Mr. White's indictment :—

- (1) With what number of fowls did Mr. White start?
- (2) What relationship did the males of his foundation stock bear to the females?
- (3) How many pens did he start with?
- (4) What system of identification of individual pedigree did he adopt, and what principles of mating?
- (5) Did he ever introduce fresh blood?

(6) On what basis did he select his breeding stock?

(7) What proportion of his stock did he cast year by year?

(8) How did he feed?

Mr. White is also a little careless in his generalisations; as, for instance, when he tells us that all animals diminish in size towards the equator. The biggest fowls we know, the Brahma and the Aseel, are both of tropical origin, and at this very day Java can shew fowls of native race as big as any that have ever been seen at the "Palace."

It is not nearness to the tropics nor is it altitude that militates most against the Rhodesian poultry keeper. His worst climatic enemies are drought and lack of living shade. In our present weather, runs require frequent spraying; and the more green shade we can give our birds, the better for us and them.

"GALLINULE."

SISAL HEMP AND MUNGA.

To the Editor,

Rhodesia Agricultural Journal.

Sir,

Could you please give me any brief particulars as to the culture and average market prices of Sisal hemp? Has it been tried on a commercial scale in Southern Rhodesia?

I should be very glad if you could also give me an analysis of "munga," or bulrush-headed millet, as I believe it is called. A discussion recently took place as to the relative albuminoid ratios of it and maize, in which a prominent farmer of my district maintained that analysis proved the two to be identical, and thus any extra money paid by, say, a poultry farmer for the former was wasted. Is not the albuminoid ratio of the former roughly 1 : 5 and that of the latter 1 : 7? Quite a considerable difference.

I am, etc.,

"A."

2nd November, 1912.

REPLY.

Fibre Crops—Agave Rigida, var. Sisalana.

Experiments conducted in Southern Rhodesia with Sisal hemp, both by this Department and by private farmers, have not been very encouraging. The plant grows moderately well, but not as rapidly as it should do, and the leaves do not attain that length which is necessary for the production of a long fibre.

Mauritius hemp—*Fourcroya gigantea*—is quicker growing, and appears generally better suited to local conditions, but whether or no it would be possible to promote an industry with this fibre is not yet certain. This Department has carried out fairly extensive experiments with Mauritius hemp, and hopes before long to send home a trial parcel of fibre for valuation and sale.

In any case, however, an Agave fibre industry is a thing which must be taken up on a fairly large scale, and a big acreage under the crop would be necessary in order to support a factory.

At the present time, I am not able to recommend either of these fibre plants for cultivation on a large scale.

Mauritius hemp is usually valued at about £28 to £30 per ton of clean fibre, and Sisal hemp usually at a few pounds more per ton.

H. G. MUNDY,

Government Agriculturist and Botanist.

REPLY.

Feeding Values of Maize and Munga.

Regarding the relative feeding values of maize and munga for poultry, samples of Rhodesian grown maize and munga, recently analysed, had the following composition :—

	Nyouti or Munga (<i>Pennisetum spicatum</i>).	Maize.
	per cent.	per cent.
Water.	9.4	10.5
Fat	4.3	4.6
Protein	11.3	10.0
Carbohydrates (by difference) . . .	71.3	71.8
Fibre.	1.5	1.9
Ash	2.2	1.2
	<hr/> 100.0	<hr/> 100.0

Comparatively little scientific investigation has so far been done in respect to the feeding of poultry, and in making up a ration it is possible to devise one which will be decidedly inefficient at times, if the chemical composition is alone considered. Although munga and maize are not widely different in composition, it is the experience of Rhodesian poultry fanciers that fowls contract so called "liver disease" if crushed maize is much used, whereas munga does not produce this undesirable result. Munga on that account is locally a much more efficient poultry food than maize.

The only portion of foodstuffs of nutritive value is that which can be digested, and in the absence of specific data regarding the proportion of each constituent of a foodstuff digested by poultry, calculations must be based upon the percentage amounts digested by other animals.

The nutritive or albuminoid ratio of a foodstuff is the ratio of the digestible protein (albuminoids) to the digestible non-proteins expressed in an equivalent of starch, and can be stated as follows :—

$$\text{Albuminoid ratio} = \frac{\text{digestible carbohydrates} + (\text{digestible fats} \times 2.3)}{\text{digestible protein}}$$

Assuming that the constituents of munga and maize are equally digestible, and that poultry digest 85 per cent. of the fat, 75 per cent. of the protein and 90 per cent. of the carbohydrates : the albuminoid ratio of munga = 1 : 8.5 and of maize 1 : 9.8.

From this it will be seen that for munga and maize of the compositions given above the ratio is a little wider in the case of maize, or, in other words, maize has a slightly lower feeding value.

GEORGE N. BLACKSHAW,
Government Agricultural Chemist.

MANURIAL EXPERIMENTS.

To the Editor,

Rhodesia Agricultural Journal.

Sir,

From Mr. Blackshaw's report (*Rhodesia Agricultural Journal*, August, 1912) *re* manurial experiments the following facts appear to have been omitted in connection with the guano used :—

(1) The consignment (from which the material used was taken) was thoroughly soaked by rain in transit.

(2) In addition to the above detrimental circumstance, the manure, after sustaining the damage stated, lay for a period of about eleven months in Salisbury before being used.

I would be obliged if you would also allow me to state that a previous sample of this guano in perfect condition gave on analysis : Nitrogen, 9.94 per cent. ; phosphoric oxide, 4.83 per cent. ; potash, 1.75 per cent. This was valued by the Agricultural Chemist at £10 per ton in Salisbury, a full statement appearing in the *Agricultural Journal* for August, 1910.

While not caring to maintain that all the material referred to as upon this farm would give the higher value (although it might, just as easily as it might not), I think that the foregoing details deserve some consideration.

In conclusion, I beg leave to assert that, in view of the facts I have stated, the deposit of guano spoken of by Mr. Blackshaw in his report did not get a fair trial in the experiments described by him.

I am, etc.,

J. M. GORDON.

Nyaroro,

P.O., Golden Kopje,

Lomagundi, 30th September, 1912.

[Certain portions of Mr. Gordon's letter, not considered relevant to the matter under discussion, have been deleted.—
ED.]

REPLY.

Mr. Gordon informed me at the time the consignment was sent in that the material was wetted in transit, but made no mention of drainage from the bags. Being a trial consignment, to be placed on its merits, I naturally thought that his agents would have been instructed to advise buyers accordingly, had the damage sustained been considerable. That was the conclusion to which I came, and consequently an order for a small quantity, expressly for experimental purposes, was placed with Messrs. Whitfield & Co. A few days ago (25th October) I learnt for the first time that the material was soaked to such an extent that a dark brown liquid drained from the bags; loss of soluble manurial ingredients must naturally have been the result.

In regard to the second point raised in Mr. Gordon's letter, during the months it was stored in Messrs. Whitfield and Co.'s warehouse, the guano did not appear to have suffered any deterioration.

Now for the question of valuation: my valuation of the first sample at £10 per ton in Salisbury was, as I pointed out at the time, based upon the cost of Cape guano delivered in Salisbury, viz., £13 per ton. I also stated that the price quoted was only *comparative*, and did not necessarily represent its *real* value.

Owing to high railway freight, fertilisers have to be imported in concentrated form, consequently Cape guano has not come into use in Rhodesia. I, therefore, based the value of the consignment subsequently sent to Messrs. Whitfield and Co. (second sample examined) upon the prices ruling at the time for fertilisers in common use in Rhodesia.

A definite valuation of the material can, however, only be arrived at by field trials, and it was for the purpose of acquiring information on this point that the bats' guano was given a trial in the manurial experiments last season. As the material was evidently damaged by rain, the trial of last season will be repeated.

GEORGE N. BLACKSHAW,
Government Agricultural Chemist.

Veterinary Report.

September, 1912.

SALISBURY.

AFRICAN COAST FEVER.—No fresh outbreak and no further cases on the infected section of the Commonage.

The Government Veterinary Bacteriologist reports the following imported animals inoculated against Bovine Plasmoses :—

- 1 Friesland Bull *ex* America. Discharged immune.
- 1 Jersey Bull *ex* Cape Colony. Discharged immune.
- 2 Shorthorn Bulls *ex* Great Britain.
- 2 Aberdeen Angus Bulls *ex* Great Britain. One dead.
- 5 Sussex Bulls *ex* Great Britain.

A Shorthorn Bull recently imported from Great Britain died on the farm Gletwyn from Redwater.

BULAWAYO.

AFRICAN COAST FEVER.—At Collaton and Irene 15 animals were destroyed on shewing a rise of temperature, bringing the total mortality to date up to 406.

Wollendale.—A recrudescence of this disease occurred amongst some native cattle located on the western side of the railway line. Three deaths occurred. This outbreak is most probably due to the cattle straying on to the infected veld at Collaton. Some time prior to the outbreak, one of the native owners concerned allowed some of his cattle to stray to infected veld on Collaton, where they were detained. Proceedings were taken against him and a conviction obtained.

HORSE SICKNESS INOCULATION.—Ten mules treated without fatality.

MALLEIN TEST (including Plumtree).—The following animals were tested on importation and found free from glanders :—Horses, 55 ; mules, 79 ; donkeys, 89.

IMPORTATIONS :—

Bulls	...	...	26
Heifers	...	...	268
Sheep and Goats	...	...	4548
Pigs	...	...	20

UMTALI.

AFRICAN COAST FEVER.—No fresh outbreaks and no further cases on the infected section of the Commonage.

ARSENICAL POISONING.—As the result of an error in preparing the Laboratory Dip 165 head of cattle belonging to the Land Settlement Department died at the Imbeza Valley after their first immersion in the tank. The majority of the survivors were severely affected, the skin coming off in large patches.

INYANGA AND MAKONI.

It is now fourteen months since the last case of African Coast Fever in either district.

DISTOMIASIS.—The Assistant Veterinary Surgeon reports that in the *post-mortem* examination of two cows on the farm Inyamasisitza, he found the livers infested with fluke.

VICTORIA.

RABIES.—One outbreak reported.

ENKELDOORN.

RABIES.—One outbreak reported.

No infective disease reported from the other districts.

GENERAL.

Reports from all districts indicate the very serious position stock are in through shortage of grass and water.

J. M. SINCLAIR,
Chief Veterinary Surgeon.

Veterinary Report

October, 1912.

SALISBURY.

AFRICAN COAST FEVER.—No fresh outbreaks and no further cases on the infected section of the Commonage.

RABIES.—A dog shewing suspicious symptoms was destroyed. The Veterinary Bacteriologist reported that microscopic examination did not enable him to say whether the animal was rabid or not.

The usual test inoculations have been performed.

MALLEIN TEST.—Seven horses from Cape Colony were tested with Mallein and found healthy.

Five over age heifers imported from Cape Colony were destroyed.

Several deaths occurred on the farm Arlington, but the cause has not yet been ascertained.

REDWATER INOCULATION.—Eight bulls were released from the Letombo Camp, having been successfully immunised against Redwater and Gallsickness.

DISTOMIASIS (FLUKE DISEASE).—Specimens of *Fasciola Hepatica* were received from a sheep born and bred on a Gwebi farm, and from a cow born and bred on a farm to the west of Salisbury. These cases shew that this parasite can become established when introduced into certain districts.

BULAWAYO.

AFRICAN COAST FEVER.—At Collaton there was a marked decrease during the month in the number of deaths. Three head only were destroyed, bringing the total mortality up to 409.

Wollendale.—No further cases occurred at this centre. The cattle are under strict supervision and are dipped every three days. Total number of deaths to date, 3.

MALLEIN TEST (including Gwanda and Plumtree).—The following animals were tested on importation :—Horses, 19 ; mules, 13 ; donkeys, 204.

One horse reacted and was destroyed. *Post-mortem* examination shewed numerous glanderous nodules in the lungs.

HORSE SICKNESS INOCULATION.—Three mules inoculated without fatality.

IMPORTATIONS :—

Bulls	...	...	10
Heifers	...	...	454
Sheep and Goats	...	...	4667
Pigs	...	...	1

PLUMTREE.

PLEURO-PNEUMONIA CONTAGIOSA (LUNG-SICKNESS).—An outbreak of this disease occurred towards the end of the month on the farm Summerton. One animal only affected so far.

All the cattle on Summerton and adjoining farms were placed in quarantine, and all movement of cattle in the Plumtree transport area prohibited.

This is the first outbreak of Lung-sickness in the Territory since 1905, and Plumtree district has been free for at least twelve years. The source of the present outbreak is without doubt the Bechuanaland Protectorate or Tati.

UMTALI.

AFRICAN COAST FEVER.—No fresh outbreaks and no further cases on the infected section of the Commonage.

MALLEIN TEST.—Five horses were tested on importation and found free from Glanders.

IMPORTATIONS.—Thirty-two head of slaughter cattle from Macequece.

MELSETTER.

MALLEIN TEST.—Two donkeys tested at Chipinga on importation and found free from Glanders.

DISTOMIASIS (FLUKE).—On *post-mortem* examination the liver of a cow which died on the farm Fairfield was found affected with fluke.

HARTLEY AND GATOOMA.

RABIES.—A suspected case occurred at Battlefields.

STIFF-SICKNESS.—Several cases reported, but on investigation poverty seemed to be the cause.

INYANGA.

One outbreak of Scab amongst sheep reported.

All other districts reported healthy, but generally the mortality from poverty was very heavy.

J. M. SINCLAIR,

Chief Veterinary Surgeon.

Agricultural Report.

23rd November, 1912.

Reports to hand from different parts of the Territory shew that the continued drought has considerably retarded agricultural operations, whilst losses of stock from starvation and lack of water have been numerous. However, the information at our disposal fails to indicate that the position is so acute as is generally supposed, and in some districts—notably Marandellas, Lomagundi, Inyanga, Melsetter, Bubi and Gwanda—cattle are generally in good condition. Crops sown in anticipation of early rains have failed in most instances, but, given good rains within the next few weeks, the losses will be recoverable. In any case, there is as yet no cause for alarm, as the rains have often been as late as they are this season, and yet good crops reaped.

The season has given farmers ample time to plough, and the acreage under cultivation during the coming season should be much greater than that of last year. This is particularly the case in the Hartley district, where, given a fair rainfall, hopes are entertained that it will be self-supporting in the matter of grain. As an indication of the severity of the season, it might be mentioned that the celebrated "Hippo Pools" in the Umfuli River are dry, a state of affairs never anticipated by the oldest residents, for one pool had the reputation of being over 80 feet deep.

In the Bubi district orchards are all looking well, and citrus trees are in full fruit. Grapes are well advanced and healthy, shewing no signs of blight. Stone fruits, such as peaches, apricots and plums, promise a heavy yield, especially the Japanese varieties.

Messrs. Liebig & Co. continue to improve their holdings. There are now good roads in all directions, while the different sections are connected by telephone, the main camp being connected with West Nicholson.

Garden Calendar.

By N. L. KAYE-EDDIE.

THE FLOWER GARDEN.

January.—This month requires all one's energy in the flower garden. Annuals may still be sown for late flowering before the season is over. Planting out should be done as early as the weather permits and advantage taken of a dull day after a shower for this work. If care be exercised much smaller plants may be put out than would at first be thought advisable, as with attention these will make stronger plants than larger ones which are more likely to receive a check. The soil requires constant stirring, owing to the packing caused by the rains and for the eradication of weeds, which are now very troublesome. All plants should be kept free of dead and decaying matter.

THE VEGETABLE GARDEN.

January.—Turnips, carrots, cabbage, lettuce, etc., may be sown for carrying on during the winter months. Potatoes may be planted this month for keeping through the winter. Weeding and cultivating between the rows should be continually carried on.

Market Reports.

25th November, 1912.

Owing to the continued drought, the prices of produce at Salisbury, in common with most other centres in South Africa, are higher than they have been for many years. Practically no potatoes are obtainable, and the new crop, even with favourable weather, cannot be expected before Christmas. There is every prospect of a very big shortage in mealies, and there is no doubt but that we shall have to import before the new crop comes in. There is a large demand for beans and monkey nuts, but none of the former are obtainable, whilst monkey nuts are very scarce. Oat forage and onions are abundant—in fact, the supply of the latter is now too great for local consumption.

Advices from Bulawayo are to the effect that potatoes and vegetables are very scarce. Mealies are now being imported from the south, and prices have eased somewhat.

Article.	Johannesburg.	Kimberley.	Bulawayo.	Salisbury.
Barley, 150 lbs. -	10/0 12/6	—	—	27/6 30/0
Beans, 203 lbs. -	32/0 40/0	35/6 37/6	—	none
Boer Meal, unsifted, 200 lbs. -	—	26/0 28/0	40/0	37/6 40/0
Bran, wheaten, 100 lbs. -	7/6 8/6	6/0 6/6	15/0 16/0	16/0 17/6
Flour, 100 lbs. -	—	—	25/6 26/6	20/0 24/6
„ Colonial, 100 lbs. -	—	14/0 15/0	23/0 23/6	none
Forage, 100 lbs. -	5/0 6/6	5/6 7/0	10/6 12/0	7/6 8/0
„ Colonial Oat -	7/9 8/0	6/6 7/0	—	none
Hay -	Bale. 6d. 1/0	—	Ton. 57/6 60/0	Ton. 50/0 60/0
Kaffir Corn, 200 lbs. -	17/0 18/0	16/0 17/0	24/6 25/0	none
Manna, 100 lbs. -	5/0 5/6	—	—	6/0 7/0
Mealies, S.A. White, 203 lbs. -	16/0 16/6	13/6 14/0	23/0 24/0	22/6 23/6
Mealies, Yellow, 203 lbs. -	14/6 15/0	12/9 13/0	22/0 23/0	none
Mealie Meal, White, 200 lbs. -	—	15/0 16/0	—	22/0 23/0
Munga, 200 lbs. -	—	—	—	none
Monkey Nuts, bag -	—	—	20/0 21/0	19/0 20/0
Oats, 150 lbs. -	9/0 11/0	10/6 11/6	21/6	22/6 23/6
Onions, 120 lbs. -	—	14/6 16/6	22/6 23/0	17/6 20/0
Peas, 200 lbs. -	24/0 26/0	—	—	none
Potatoes, new, 150 lbs. -	30/0 35/0	26/0 28/0	40/0 42/6	40/0 42/6
„ 150 lbs. -	20/0 26/6	22/0 25/0	—	—
Rapoko -	—	—	—	—
Rye, 200 lbs. -	11/0 13/0	—	—	—
Salt, 200 lbs. -	—	—	10/6 11/0	14/6 15/0
Wheat, 203 lbs. -	18/6 24/0	19/6 20/0	—	29/0 30/0
Butter, local, per lb. -	1/6 2/0	1/3 2/0	1/6 1/9	1/9 2/6
Eggs, local, per dozen -	9d. 1/9	8d. 1/0	—	2/0 2/6
Ducks, each -	2/6 3/3	2/6 4/0	—	3/0 5/6
Fowls, each -	2/6 3/3	2/9 3/6	1/1 2/3	3/0 7/6
Geese, each -	3/0 4/0	—	—	—
Turkeys, cocks, each -	8/6 15/0	11/0 13/0	7/6 14/0	—

LIVE STOCK.

Slaughter Cattle, 100 lbs. -	39/0	—	37/6 40/0	40/0 42/6
Trek Oxen, trained -	£8/10 £10/10	£7/10 £8/10	£8/10 £12	£10/10 £12/10
Local Cows, milk -	—	£7 £8/5	£25 £30	£20 £25
Dairy Cows -	£20 £40	—	£25 £35	£25 £35
Native Cows -	—	—	—	£8 £10
Heifers, Colonial -	£6 £8	—	£8 £17/10	£11 £18/10
„ Native -	—	—	—	—
Pigs, live weight -	3d. 4d.	2d. 3d.	—	4½d.
Horses, riding, salted -	—	—	—	£30 £32/10
„ „ unsalted -	£20 £30	£10 £25	£25 £35	£20 £25
Mules, inoculated -	£20 £30	£18 £25	£35 £40	£20 £35
Donkeys, geldings -	£5/10 £7	£5 £7	£8/10 £10/10	—
„ mares -	—	£6 £7/10	—	£5 £8/10
Goats -	9/0 15/0	12/6	—	20/0 22/6
Persian Ewes -	—	—	18/6 22/6	—
Cross-bred Ewes -	—	—	—	—
Sheep, slaughter -	6d.	17/6 25/0	—	—

Weather Bureau.

TEMPERATURES.

STATION	SEPTEMBER		OCTOBER	
	Max.	Min.	Max.	Min.
MASHONALAND—				
Charter, Grootfontein ...	78·0	46·6	84·3	48·8
Hartley, Giant Mine ...	86·6	53·9	87·5	59·8
„ Hallingbury Farm ...	84·3	50·8	88·2	54·1
Lomagundi, Sinoia ...	88·0	49·1	90·6	50·3
Mangwendi, “Good Hope” ...	84·2	—	88·7	—
Melsetter, Government Offices ...	74·6	—	75·8	52·1
„ Mount Selinda ...	73·7	50·7	76·3	52·4
Salisbury, Agricultural Laboratory ...	80·9	51·0	83·2	53·4
„ Chishawasha ...	82·4	49·8	85·0	51·4
„ The Gaol... ...	81·6	51·6	83·5	53·0
„ Shamva Mine ...	85·1	56·5	—	—
Umtali, Chiconga's Location ...	85·9	54·3	85·8	56·5
„ Summerfield ...	77·6	50·8	79·7	57·8
MATABELELAND—				
Bulalima, Plumtree ...	76·2	53·6	—	—
Bulawayo, Essexvale ...	81·5	50·2	81·5	55·7
„ Observatory ...	79·8	51·9	—	—
„ Rhodes Matopo Park... ..	78·1	49·9	84·4	56·0
Gwelo, The Gaol ...	81·1	50·6	84·2	52·7
Mangwe, Empandeni ...	81·3	49·9	83·3	56·4
Tuli, Police Camp ...	88·8	53·2	91·9	61·2

RAINFALL.

STATION	Sept.	Oct.
MASHONALAND :		
Charter—		
Driefontein	0·06	—
Grootfontein	0·04	—
Enkeldoorn	—	—
Marshbrook	—	—
The Range	0·03	—
Rhodesdale Estate	0·01	—
Umvuma (Railway)	—	—

RAINFALL—(Continued).

STATION				Sept.	Oct.
MASHONALAND—(Continued)					
Hartley—					
Ardgowan	...	...	...	—	—
Battlefields (Railway)	...	...	...	—	—
Elandsfontein	...	...	...	—	0·39
Gatooma	...	...	...	—	0·05
Gatooma (Railway)	...	...	...	—	—
Giant Mine	...	...	...	—	0·26
Gowerlands	...	...	...	—	—
Hallingbury	...	...	...	0·12	—
Hartley (Railway)	...	...	...	—	—
Makwiro	...	...	...	0·09	0·12
Shagari	...	...	...	—	0·05
“Jenkinstown”	...	...	...	—	0·02
“Stoneygate”	...	...	...	—	0·05
Lomagundi—					
Banket Junction	...	...	...	—	0·15
Eldorado	...	...	...	—	—
Duxbury Farm	...	...	...	0·04	1·19
Lone Cow Estate	...	...	...	—	—
Palm Tree Farm	...	...	...	0·24	0·09
Sinoia	...	...	...	0·34	0·07
Makoni—					
Eagle's Nest	...	...	...	—	0·04
Macheke (Railway)	...	...	...	—	—
Monte Casino	...	...	...	—	0·01
Rusape (Railway)	...	...	...	0·04	—
Rusape (Police Camp)	...	...	...	—	—
Mangwendi—					
Bonongwe	...	...	...	0·05	—
“Good Hope”	...	...	...	—	0·22
Marandellas	...	...	...	—	0·66
Marandellas (Railway)	...	...	...	—	—
Mrewa	...	...	...	—	0·45
Land Settlement Farm	...	...	...	—	—
Tweedjan	...	...	...	0·06	—
Mazoe					
Claverhill	...	...	...	—	0·23
Kimberley Reefs	...	...	...	—	0·12
Laguha	...	...	...	—	0·27
Sunnyside	...	...	...	—	—
Teign	...	...	...	0·05	—
Melsetter—					
Chikore	...	...	...	0·70	—
Chipinga	...	...	...	0·77	0·28
Government Offices	...	...	...	0·12	0·04
Tom's Hope	...	...	...	0·82	0·47
Mount Selinda	...	...	...	1·15	0·94
Vermont	...	...	...	1·10	0·68
Inyanga (Police Camp)	...	...	...	—	0·35

RAINFALL—(Continued).

STATION				Sept.	Oct.
MASHONALAND (Continued)					
Salisbury—					
Avondale	...	...	...	—	0·05
Agricultural Laboratory	...	...	...	0·01	0·23
Brookmead	...	...	...	—	0·04
Chishawasha	...	...	...	—	0·09
Cleveland Reservoir	...	...	...	—	0·20
Darwendale	...	...	...	0·41	—
Gaol	...	...	...	0·04	0·32
Goromonzi	...	...	...	—	0·29
The Meadows	...	...	...	—	0·40
Public Gardens	...	...	...	—	0·18
Railway Station	...	...	...	—	—
Shamva Mine	...	...	...	—	—
Umtali—					
Champion Mine	...	...	...	0·05	0·02
Chiconga's Location	...	...	...	0·02	0·33
Mutumbarra Mission	...	...	...	0·08	—
Railway Station	...	...	...	0·09	—
Selim Mine	...	...	...	0·04	0·03
Summerfield	...	...	...	0·06	0·09
Utopia	...	...	...	0·03	0·06
Victoria—					
Empress Mine	...	...	...	0·07	—
Gutu	...	...	...	—	—
Gokomere	...	...	...	0·11	—
Halliday's Farm	...	...	...	0·08	—
Marthadale	...	...	...	0·23	0·04
Morgenster	...	...	...	0·46	0·14
Noeldale	...	...	...	0·08	—
Silver Oaks	...	...	...	0·11	—
MATABELELAND :					
Bubi—					
Dawn Farm	...	...	...	0·16	0·83
Fort Rixon	...	...	...	0·21	0·22
Infiningwe	...	...	...	0·25	—
Maxim Hill	...	...	...	—	—
Bulalima—					
Tegwani	...	...	...	—	0·15
Plumtree	...	...	...	0·09	—
Bulawayo—					
Bembesi (Railway)	...	...	...	0·10	—
Essexvale	...	...	...	0·01	0·22
Figtree	...	...	...	0·12	—
Filabusi	...	...	...	0·06	0·01
Gwaai (Railway)	...	...	...	—	—

RAINFALL (*Continued*).

STATION				Sept.	Oct.
MATABELELAND—(Continued)					
Bulawayo (Continued)					
Heany Junction	...	...	...	0·02	—
Hope Fountain	...	...	...	0·03	—
Imbesa Kraal	...	...	...	0·14	0·01
Insiza (Railway)	...	...	...	0·14	—
Khami	...	...	...	0·03	0·10
Lochard	...	...	...	0·12	0·09
Matopo Mission	...	...	...	0·01	—
Nyamandhlovu	...	...	...	—	—
Observatory	...	...	...	0·05	—
Raylton	...	...	...	0·04	—
Rhodes Matopo Park	...	...	...	0·09	0·06
Solusi	...	...	...	0·12	0·04
Syringa	...	...	...	—	0·18
Umgusa	...	...	...	—	—
Pendennis Farm	...	...	...	0·08	1·22
Thornville	...	...	...	0·22	—
Gwanda—					
Balla Balla (Railway)	...	...	...	0·04	—
Gwanda (Railway)	...	...	...	—	—
Mtshabzi Mission	...	...	...	0·06	0·11
West Nicholson (Railway)	...	...	...	0·12	—
Gwelo—					
Lalapanzi	...	...	...	0·15	—
Lower Gwelo	...	...	...	0·03	—
The Gaol	...	...	...	0·08	—
Globe and Phoenix (Railway)	...	...	...	—	—
Gwelo (Railway)	...	...	...	—	—
Selukwe	...	...	...	0·21	—
Shawlands	...	...	...	0·05	—
Mangwe—					
Garth	...	...	...	0·10	0·01
Empandeni	...	...	...	0·01	—
Sebungwe—					
Kariyangwe	...	...	...	—	—
Tuli—					
Lamulas	...	...	...	0·12	—
Police Camp	...	...	...	—	0·07
Mazunga	...	...	...	—	0·13
Wankies—					
Malindi (Railway)	...	...	...	—	0·19
Victoria Falls (Railway)	...	...	...	—	—
Wankies Hospital	...	...	...	—	0·31
Wankies (Railway)	...	...	...	—	—

Dates of Meetings of Farmers' Associations, Southern Rhodesia

(SUBJECT TO ALTERATION)

Name of Association	Place of Meeting	Secretary	1912 & 1913		
			Dec.	Jan.	Feb.
Charter—Mgezi ..	Beatrice Mine and Mgezi River alternately	W. Kricke	..	29	..
*Central ..	Umvuna and Enkeldoorn	R. Aldons	28	..	..
Chipinga ..	Chipinga ..	L. Dohell	..	..	..
Enterprise ..	Acturus ..	R. Philip	10	14	11
Figtree Branch, R.L. and F.A. ..	Figtree Siding	A. Curtis	..	..	..
Gatoona ..	Gatoona	Col. T. T. Leonard	5	2	6
Gazaland ..	Lower Nelsetter	Lionel Gobel	..	..	..
Hartley ..	Hartley	H. F. Savory	7	..	..
Headlands ..	Headlands	J. M. Harvard	..	25	..
Inisiza ..	Inisiza Station	F. D. Jones	..	4	..
Kimberley Reefs ..	Kimberley Reefs	S. E. Ford	13	12	..
Lalapanzani ..	Lalapanzani	B. Smit	21	18	15
Lomagundi ..	Sinola	J. N. Bateman	..	4	..
Macheke ..	Ruspe	H. H. Kidson	7	4	1
Makoni ..	Makwiro	W. S. Tapson	19	18	15
Manica ..	Xmas Pass Hotel	A. B. Fraser	..	4	..
Marandellas ..	Marandellas and Settlement Farm	J. S. Holland	7	4	1
Mangwendi ..	Fixed every meeting	C. M. Wright	7	..	..
Marula ..	Marula Siding	MacW. Ingram	28	8	22
Mashonaland ..	Salisbury	W. H. Williamson	13	10	14
Matopo Branch, R.L. and F.A. ..	Matopos Terminus Hotel	W. E. Dowsett	..	..	..
Maze ..	Maze	E. W. L. Noaks	..	..	..
Melsetter (North) ..	Various Farm Houses	N. N. Rutherford	..	..	..
Midlands ..	Gwelo	M. L. Price	14	11	8
Northern ..	Farm "Jerain"	Chas. Atkinson	6	..	..
Plumtree ..	Plumtree	A. J. Bowman	13	..	..
Rhodesian Landowners and Farmers ..	Globe & Phoenix Hotel..	Harry Hopkins	14	11	8
Que Que ..	Bulawayo	J. M. Mowbray	27	31	28
Shamva ..	Farm "Fairview"	S. Annandale	7	..	..
Somabula and Shangani Flats ..	Farm "Fairview"	N. N. Rutherford	7	..	..
Umvuvumvuna ..	T.Membarra Mission	J. Rutherford	18	15	10
Victoria ..	Victoria	..	..	..	..

* Headquarters at Umvuna. One Meeting in each quarter held at Enkeldoorn.

Departmental Notices.

Information for Farmers

The Department of Agriculture is prepared to furnish to farmers technical advice either by correspondence, or, where possible, by personal visits. All communications should be addressed in the first instance to the Director of Agriculture.

Crops

The Agricultural Branch deals with enquiries relating to agricultural practice, soils, crops, cultural operations, processes, seeds, trees, farm implements and machinery, etc.

Poisonous Plants

It is of great importance that as soon as possible a study should be made of those plants found in Southern Rhodesia which are poisonous or deleterious to small or large stock. Farmers and others who have known, or suspected poisonous plants on their property, are requested to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, at the same time forwarding specimens of the plant, including stem, leaves, flowers, and, where possible, fruit. Any particular regarding the habits of the plant will be welcomed, and in return the Department will supply all available information regarding the plants.

Disposal of Seeds

All farmers and others who have surplus supplies of good quality locally grown farm seed of any description are invited to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, stating what

quantities are available for sale, and price f.o.r. nearest station. In all cases representative samples of the grain must accompany the letter, but need not exceed two ounces in weight.

The Agricultural Department is continually receiving enquiries as to where various seeds can be obtained, and it is hoped that by the above means growers of reliable seed may be brought into touch with one another.

It must be clearly understood, however, that beyond recommending sources of supply, the Department cannot take any further part in the transaction.

Sale of Paspalum Plants

Roots of this valuable winter pasture grass, suitable both for moist and dry situations, will be available for sale from December onwards at the rate of 5s. per 1,000 slips f.o.r. Salisbury. A root can be broken up into from thirty to fifty or more slips and, when ordering, the number of slips required should be stated. Applications, accompanied by remittance, to be addressed to the Government Agriculturist and Botanist, Department of Agriculture, Salisbury.

Tobacco

The services of the Tobacco Expert are available to all desiring advice on the subject. Applications should be accompanied by particulars of the nature of the information sought, also the distance and direction of the farm from some well known centre.

The Department of Agriculture is distributing in small quantities a few varieties of Virginia, Turkish and Cigar leaf tobacco seed to farmers for experimental purposes. Application for the seed should be made to the Tobacco Expert, Department of Agriculture, Salisbury. Tobacco seed for ordinary crop requirements is sold by the Tobacco Company of Rhodesia and South Africa, Limited, and application should be made to the Manager, Tobacco Warehouse, Salisbury.

Live Stock

The Animal Industry Branch is prepared to advise with regard to all matters connected with stock breeding, selection and feeding of stud animals, the dairy industry, poultry management, farm buildings for stock, and kindred subjects. Buyers and sellers of stud stock in Rhodesia are also put in touch with one another.

Purchase of Stock in the Cape and Free State Provinces of the South African Union, on behalf of Farmers resident in Southern Rhodesia

The following amended arrangements are published for general information :—

The Government undertakes the purchase of pure-bred live stock for farmers on the conditions outlined below, and on the following terms of payment, viz. :—(1) a deposit on application; (2) one-third total cost on delivery, less amount of deposit; (3) one-third after six months, and (4) one-third after twelve months—both these instalments bearing interest at 6 per cent. or 10 per cent. if not paid at due date. These terms of credit will only be allowed on purchases up to a total maximum value of £200; sums exceeding that amount are payable in cash along with the first instalment. The Government reserves the right to refuse, without reason given, applications, or to fulfil purchases even after deposit has been made. Applications must be on the prescribed Form "A," and all conditions complied with before same is registered. Applications will be considered in rotation, but fulfilled as opportunity serves, so that animals may be procured as cheaply as possible. The buyer must undertake to accept the animal allotted to him, unless it fails to satisfy description as given in the application form. Disputes may be submitted to arbitration. The purchase price will include all expenses up to time of delivery, price paid to original owner, commission and charges of buyer and freight, including, where necessary, attendance and keep on journey. With every application a deposit must be forwarded; £1 per head in the case of cattle, horses and donkeys, and 5s. per head for sheep, goats and pigs. Such deposit will

be deducted from the amount of the first instalment due, but may be forfeited in the event of the application being withdrawn after having been registered. Stock is not to be disposed of without the written consent of the Director of Agriculture until payment is completed.

Purchases will be made by the Department of Agriculture through its authorised representatives. Every effort will be made to secure animals in accordance with particulars furnished by applicants, and to the best advantage. All purchases must conform strictly to the importation regulations as regards age and freedom from contact with contagious disease. Pedigrees, if obtainable, will be supplied. The Government will bear all risks of transport and of death from any cause until delivery, all losses being chargeable to the vote. All animals failing to pass the necessary test on arrival shall be destroyed and the loss borne by the Government, and another animal purchased for the applicant.

Prospective buyers will be advised of the probable cost. The Department does not undertake to purchase stock at precisely the prices specified by applicants, but will endeavour to approximate as nearly as possible to the figures given and not to exceed same by over 20 per cent. The authorised representatives of the Department will be allowed a reasonable commission, with expenses additional.

The first instalment will become due and payable on delivery. Applicants or their agents will be advised regarding arrival of their stock, after which all responsibility on the part of the Department will cease.

Owing to the present outbreak of foot and mouth disease in Great Britain and Ireland, the purchase of all stock from there is suspended.

Entomology

The Government Entomologist advises on matters connected with insect pests of live stock, crops, and fruit trees, and also undertakes the inspection of nurseries and of the importation of plants from abroad.

Chemical Analyses

The Government Agricultural Chemist deals with matters relating to the composition of soils, fertilisers, farm produce of vegetable or animal origin; also the investigation of poisons and of articles of potential economic value.

Nominal charges are made, which, while not covering the cost, will help to defray the expense and serve as a proof of good faith. Samples, carriage prepaid, together with full particulars regarding the subject should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

A schedule of charges and directions for taking samples will be furnished on application.

With all analyses, reports will be furnished explanatory of the results and, when possible, advice given as to the nature, properties and value of the material.

No charge will be made for analysis where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Services of Government Veterinary Surgeons

1. The services of Government Veterinary Surgeons are available to the public, free of charge, for the following purposes only :—

- (1) Attending and giving professional advice in connection with the following diseases, viz. :—Anthrax, Contagious abortion, East Coast Fever, Epizootic Lymphangitis, Foot and Mouth Disease, Farcy, Foot-rot, Heartwater, Glanders, Intestinal parasites amongst sheep and goats, Liver Disease, Lung sickness, Osteo Porosis, Malarial Catarrhal Fever (blue tongue), Rabies, Redwater, Rinderpest, Scabies, Sponziekte (quarter evil), Swine Fever, and any other diseases which may in future be scheduled in terms of section 3, sub-section 18 of the "Animals Diseases Consolidation Ordinance, 1906." Attending to cases of disease amongst live

stock which, though not of a contagious or infectious character, may be of general public importance.

- (2) Applying tests in regard to Glanders, Tuberculosis, or any other disease against the introduction or spread of which tests are applied under regulations.

- (3) Inoculations against the following diseases :—

Horsesickness, Lungsickness, Anthrax, Quarter Evil, Redwater, Malarial Catarrhal Fever (blue tongue). A fee to cover the cost of serum and virus will be charged.

2. The following charges shall be made and payable for services rendered by the Government Veterinary Surgeons in other cases, viz. :—

	£	s.	d.
(1) For every professional visit within three miles of his office or residence	0	5	0
(2) For every professional visit beyond such distance	0	10	6
plus an additional charge of 2/6 per hour whilst engaged in such visits or £2/2/0 a day of 24 hours ;			
(3) For advice given at the Veterinary Surgeon's office, for each animal, per visit	0	2	6
(4) The following to be charged in addition to visiting fees :—			
a. For every examination as to soundness, each	1	1	0
b. For castration, horses, each	1	1	0
c. For castration, bulls, each	0	5	0
d. For castration, donkeys, each.. ...	0	10	6
e. For parturition cases, mares, each	2	2	0
f. For parturition cases, cows, each..	1	1	0
g. For other operations, according to nature, from 5/- to £2/2/0.			

3. Double the above fees will be payable for services rendered on Sundays, public holidays, and between the hours of 7 p.m. and 7 a.m.

4. Applicants for the services of Government Veterinary Surgeons must at their own cost provide the necessary transport for the conveyance of these officers from, and back to, their residence or nearest railway station.

5. Farmers and owners of stock throughout the country frequently telegraph for a Government Veterinary Surgeon to be sent to attend an animal which has been taken seriously ill. It is rarely possible to comply with these requests at once, as the Veterinary Surgeon may be engaged on duty which he cannot leave, or is at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any service in an urgent case. Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the veterinary staff discredited. To obviate this, in all cases where veterinary advice and assistance are required, the owner should telegraph to "Veteran," Salisbury, with prepaid reply, the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible. This will enable the Chief Veterinary Surgeon to telegraph advice at once and state whether he is able to arrange for veterinary attendance on the case or not, and save valuable time, which is always of importance in acute cases.

6. The services of Government Veterinary Surgeons will only be available for private work with the consent of such officers, and when such work does not interfere with their official duties, or when the services of a private practitioner are not available.

7. As the arrangement of allowing Government Veterinary Surgeons to attend to private cases is intended purely for the benefit of farmers and stock-owners who may wish to obtain professional advice, no responsibility whatever will be accepted for any loss of stock, etc., which may result from the negligent treatment or advice, or wilful default, of any Government Veterinary Surgeon.

8. All fees collected in terms of these Regulations are payable to the Treasury through the local Receiver of Revenue.

Forestry—Sale of Seedling Forest Trees

It is anticipated that limited numbers of the undermentioned seedling trees will be available for sale from December onwards. The conditions of sale are as heretofore, and the price is 8/4 per 100 in trays f.o.r. Salisbury.

Orders will be met as far as available stocks permit, and where possible applications will be dealt with in the order received. Trees are consigned by rail or post at purchasers' risks.

Applications, together with cheque or money order, should be addressed to the Government Agriculturist and Botanist, Department of Agriculture, Salisbury.

Saligna gum	=	<i>Eucalyptus saligna</i>
Swamp-mahogany gum	=	" <i>robusta</i>
Rostrata gum, narrow leaf	=	" <i>rostrata</i>
" " broad leaf	=	" "
Lemon-scented gum	=	" <i>citriodora</i>
Giant gum	=	" <i>amygdalina</i>
Box-tree gum	=	" <i>hemiphloia</i>
Indian toona	=	<i>Cedrela toona</i>
Common cypress	=	<i>Cupressus sempervirens</i> , vars. <i>pyramidalis</i> and <i>horizontalis</i>
Arizona cypress	=	<i>Cupressus arizonica</i>
Beefwood	=	<i>Casuarina leptoclada</i>
Aleppo pine	=	<i>Pinus halepensis</i>
Cheer "	=	" <i>longifolia</i>
Monterey pine	=	" <i>insignis</i>
Milangi cedar	=	<i>Callitris Whytei</i>
Indian sissoo	=	<i>Dalbergia sissoo</i>
Honey-locust tree	=	<i>Gleditschia triacanthos</i>

Sale of Dip

With a view to enabling farmers to obtain dipping material at as low a rate as possible arrangements have been made whereby orders may be placed with any officer of the Veterinary Department for the purchase of supplies of Messrs.

W. Cooper & Nephew's cattle dipping fluid, adapted for three-day, five-day or less frequent dipping. The price of the dip is 48s. 6d. per 10 gallons, in not less quantities than that amount, delivered at any siding or station desired. Applications must be accompanied by remittances, without which they cannot receive attention. Coin or stamps will not be accepted. This dip is in use at all Government dipping tanks.

Dipping Tanks—Grants in Aid

The Government is prepared to assist farmers in the construction of private dipping tanks by a grant in aid on the £ for £ principle, but not to exceed, however, a total sum of £50.

This grant will only be paid to approved applicants, and after the tank has been inspected by an official appointed for this purpose and found suitable, and on production of receipted accounts in support of their claim.

Applications cannot be considered for grants in aid of tanks already constructed, and those wishing to avail themselves of this assistance should apply beforehand to the Director of Agriculture, from whom full particulars, together with plans and specifications, can be obtained.

Sale of Virus

It is notified for public information that redwater and gall-sickness (*anaplasmosis*) virus may be obtained from the Veterinary Department, Salisbury, at a charge of ten shillings per dose.

Solutions of trypan blue and the injection used in the treatment of *trypanosomiasis* (fly disease) of cattle may also be obtained at a charge of five shillings per dose and blue tongue virus at one shilling and sixpence per dozen doses.

No material will be issued unless a remittance accompanies the order.

Irrigation

From the Agricultural Engineer assistance may be obtained by farmers for the following :---

1. In the locating of possible irrigation projects.
2. In the preparation of surveys or plans and for irrigation works, including weirs, dams, furrows, pumping plants, and determining the extent of land which may be brought under irrigation schemes, together with rough estimates of costs.
3. In the supervision of construction and carrying out of projects.
4. In the selection of suitable sites for boring operations.
5. Preparing specifications, etc., regarding pumping plants, windmills, and agricultural machinery.
6. Giving general advice on cognate subjects.

Informal advice of a general character will be given to applicants making enquiry by letter or in person. Any applicant desiring professional assistance likely to occupy more than one day should apply for advice in writing. All applicants should specify clearly the nature of the project on which they seek advice, and should give full particulars as to the distance and direction of their farms from some well-known centre. Applicants will be required to provide suitable means of transport for the officer concerned during the period devoted to work on the spot; to provide any unskilled labour that may be required; and to provide for any other contingent services. Applications should be addressed to the Director of Agriculture, who will endeavour to arrange visits as far as possible in order of application, but with due regard to situation, in order to obviate unnecessary travelling and delay. The services of the Agricultural Engineer are given free, but in cases demanding prolonged individual attention, or repeated supervision, a charge may be made according to circumstances.

Samples

In connection with enquiries, especially with regard to diseases amongst crops, insect pests, soils, grain and the identification of plants, specimens should, wherever possible, be

sent, together with full details. It is found that such parcels are often forwarded without any indication of where they are from or why they were sent and it is difficult in such cases to trace the sender. It is, therefore, requested that persons when forwarding samples for examination, indicate clearly their names and address on the package, so as to enable their requirements to be attended to without delay.

Charges for Dipping Cattle at Government Dipping Tanks.

On and after the 1st November, 1912, a charge of 1d. per head will be made in respect of all cattle dipped at Government dipping tanks.

Unweaned calves will be dipped free of charge.

Payment may be made in cash or by means of books of coupons at £1, 10/- and 2/6, which can be obtained from Civil Commissioners, Native Commissioners, or through all Veterinary Surgeons and Cattle Inspectors.

The tanks to which these provisions at present apply are the following :—

Salisbury (3), Bulawayo (3), Inyati, Umtali, Penhalonga, Melsetter, Marandellas, Macheke, Mazoe, Lomagundi, Hartley, Gwelo, Selukwe, Enkeldoorn, Victoria, Gwanda, Gatooma, Que Que, Umvuma, Kimberley Reefs.

Destruction of Wild Carnivora, etc.

1. It is hereby notified for public information that rewards for the destruction of wild carnivora, etc., will be paid on the scale and conditions herein set forth.

2. Rewards will be paid as follows :—

For each lion	£5	0	0
For each leopard	1	0	0
For each cheetah	1	0	0
For each hyæna... ..	0	10	0

For each wild dog... ..	£0 10 0
For each baboon	0 2 6
For each crocodile not less than 3 feet in length	0 10 0
For each crocodile over 1 and less than 3 feet in length ...	0 2 0
For each crocodile under 1 foot in length	0 0 6
For each crocodile egg	0 0 6

3. Rewards will be paid to Europeans by the Magistrate or Native Commissioner, of the district, within three months of the date upon which the animal is killed, on a solemn declaration on the prescribed form.

4. In proof of destruction, applicants for rewards will be required to produce and surrender in the case of a leopard or cheetah the skin with the tail unsevered, and in the case of a hyæna, crocodile, wild dog or baboon the unskinned head. In the case of a lion to produce the skin and skull, the skull only to be surrendered.

5. The skins and heads surrendered for rewards shall become the property of the Government and shall be disposed of in such manner as may be decided on.

Lectures for Farmers

The services of certain of the officers of the Department of Agriculture and the Veterinary Department are available for purposes of delivering lectures on subjects upon which they have special knowledge. As far as practicable, lectures will be accompanied by demonstrations at the time or subsequently in the field. Owing to the many calls on the time of the staff and the exigencies of their duties, alternative dates are desirable in order to avoid disappointment. The following topics are offered as examples of subjects that may be dealt with in this manner, but the suggestion of other themes is invited.

Agriculture.—Maize growing; Maize selection and maintenance of the breeding plot; Points of maize and maize judg-

ing, with demonstrations; Utilisation of granite vlei soils; Ground nut culture; Rotation crops for home use and for sale; Veld improvement by winter grasses; Production of foodstuffs for the mines; Ensilage; Fungoid diseases of maize and wheat; Wheat, oats and lucerne under irrigation; The prospects of cotton culture in Southern Rhodesia.

Veterinary Hygiene.—Detection and prevention of disease; The care of live stock.

Live Stock.—Judging of cattle according to breeds, and for beef, milk and draught; feeding and kraaling of live stock; general principles of cattle breeding; management of imported stock; grading up of native or local stock with pure bred bulls.

Dairying.—Home butter-making; building and equipment of a farm dairy; handling and marketing of milk; packing and marketing of butter; construction of cow houses.

Swine Husbandry.—Breeding and feeding of swine; some suggestions for the production of first-class bacon pigs; construction of piggeries at moderate cost.

Chemistry.—The principles of soil fertility; the principles of manuring; the value of lime in agriculture; chemistry of milk and its products (accompanied by demonstrations in milk-testing).

Entomology.—Economic entomology on the farm; the role of insects and their allies in the transmission of disease; scale insects and fruit trees and methods for their control; insect pests and maize; enemies of the potato, insect and fungus; the value and objects of plant import and nursery regulations.

Irrigation.—Methods of applying water to land for irrigation; the measurement of water in connection with irrigation; canal irrigation; storage reservoirs; hints on the selection of sites and on the design of earthen and other dams; irrigation by pumping, with notes on the selection of plants.

Enquiries and invitations should in the first instance be addressed to the Director of Agriculture, Salisbury.

Breeding Stock from the Union.

The rebate of 25 per cent. hitherto allowed over the Union Government Railways as far as Vryburg, on breeding stock imported from the Union into Southern Rhodesia, will be disallowed after 31st December, 1912. The 50 per cent. rebate over the Rhodesian system, from Vryburg or Beira, will be granted as heretofore.

- ## CROPS.

ENTOMOLOGY AND VEGETABLE PATHOLOGY.

- No. 58. Onion Thrips, by R. W. Jack, F.E.S.
- No. 12. The Tsetse Fly, by Ll. E. W. Bevan, M.R.C.V.S.
- No. 46. The Head Smut of Maize, by H. Godfrey Mundy, F.L.S.
- No. 89. Insect Friends of the Farmer, by R. W. Jack, F.E.S.
- No. 66. Selection of Spraying Outfit, by R. W. Jack, F.E.S.
- No. 69. Resin Wash and Means of Applying It, by R. W. Jack, F.E.S.
- No. 75. Fumigation of Fruit Trees with Hydrocyanic Acid Gas, by R. W. Jack, F.E.S.
- No. 100. Tsetse—Preliminary Notes on the Habits of—by R. W. Jack, F.E.S.
- No. 120. Some Insect Pests of Maize, by R. W. Jack, F.E.S.

VETERINARY.

- No. 14. Bots in Equines, by R. Ferguson Stirling, M.R.C.V.S.
 - No. 54. African Coast Fever, by Ll. E. W. Bevan, M.R.C.V.S. (revised edition).
 - No. 51. Strangles, by F. D. Ferguson, M.R.C.V.S.
 - No. 113. Anaplasmoses of Cattle, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 114. Anaplasmosis of Sheep, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 117. Ephemeral Fever or Three Days' Sickness in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 118. Preparation of Blood Smears.
 - No. 121. Rabies, by Ll. E. W. Bevan, M.R.C.V.S., and T. G. Millington, M.R.C.V.S., D.V.H.
 - No. 49. Notes on Bovine Plasmoses of Southern Rhodesia, with special reference to Mashonaland, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 50. Epizootic Abortion in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 102. The Construction of Dipping Tanks for Cattle.
 - No. 103. Dipping and Tick-Destroying Agents, by Lt.-Col. H. Watkins-Pitchford.
 - No. 53. Animals Diseases Consolidation Ordinance, 1904.
 - No. 82. Difficult Parturition of the Cow, by C. R. Edmonds, M.R.C.V.S.
 - No. 91. Common Ailments of the Horse, by D. R. Chatterley, M.R.C.V.S.
 - No. 80. Detection and Prevention of Diseases of Stock, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 84. African Coast Fever—Diagnosis of Gland Puncture, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 95. Oestrus-ovis in Sheep, by Alec King.
- Conditions under which Government Veterinary Surgeons' Services are available to the public.

MISCELLANEOUS.

- Terms for Analysis by the Department of Agriculture, of Produce, Soils, Water, etc.
- No. 108. Lime Deposits in Rhodesia and their Value, by G. N. Blackshaw, B.Sc., F.C.S.
 - No. 111. Special Railway Rates for the Benefit of the Farming Community.
 - No. 83. Hints on Brickmaking, by G. S. Dyke.
 - No. 37. Rural Education in Rhodesia, by G. Duthie, M.A., F.R.S.E.

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- No. 63. Game Law : Summary of.
- No. 62. Services of Agricultural Engineer.
- No. 77. Animals Diseases Amending Ordinance, 1911.
- No. 90. Reports on Experiments—Experimental Station, Salisbury, 1910-1911, by J. H. Hampton.
- No. 10. Watering and Feeding of Live Stock on Railway.
- No. 93. Formation of Agricultural Crédit Associations in Rhodesia, by Loudon M. Douglas, F.R.S.E.
- No. 96. Swine Breeds and Breeding of, by Loudon M. Douglas, F.R.S.E.
- No. 98. Pig Breeding and Feeding, by T. M. Rixon.
- No. 104. Stock Raising, by Otto Zimmerman.
- No. 105. Bacon Curing on the Farm, by Loudon M. Douglas, F.R.S.E.
Dipping Tanks—Grants in Aid.
Forestry—Sale of Seedling Trees.
- No. 110. Utility Poultry Keeping, for Amateurs and Beginners, by "Gallinule."
- No. 119. Some Notes on Charcoal Burning, by Eric A. Nobbs, Ph.D., B.Sc.
- No. 122. Notes on the Management of Dairy Herds, by R. C. Simmons.
- No. 123. Feeding and Care of Imported Bulls, by R. C. Simmons.
- No. 124. The Manuring of Maize on the Government Experiment Farm, Gwebi, 1912.
- No. 127. Notes on the Building of Farm Homesteads, by R. C. Simmons.
- No. 129. How to Make Use of the "Fencing Ordinance, 1904," by N. H. Chataway.
- Health and Clothing.
- Malaria : its History, Prevention and Cure, by A. M. Fleming, C.M.G., M.B., F.R.C.S. (Ed.), D.P.H. (Camb.), Medical Director.

Employment on Farms.

The Department of Agriculture receives numerous enquiries from persons of varied attainments, age and financial position for openings on farms, as managers, assistants and learners, requiring remuneration on corresponding scales, or willing to give services in return for keep.

In order that work may be found and needs of farmers met, applications are invited from both employers and artisans, such as masons, bricklayers, carpenters, fencers, well sinkers, concrete workers, and the like. In cases where employers have obtained the labour they require, or applicants for employment have found work, it is requested that notification be at once sent to the Department of Agriculture, in order that unnecessary correspondence be avoided.

Replies to the following applications should be addressed to the initials of the advertisers, c/o Director of Agriculture, who will forward the letter to the party referred to.

SITUATIONS VACANT.

T. H. D.—General agriculturist, who must understand cattle. Small salary and board, with share of profits.

J. M.—Man to take charge of farm where apple growing is conducted on a large scale. A little agriculture and dairying also carried on. Salary, £15 per month. Can have any produce on farm for his own consumption free.

SCHOOL.—Man to look after dairying, cattle, orchards, gardens, etc., and give elementary instruction to pupils. Small salary and residence.

C. C. T.—Tobacco grower, experienced in growing and curing (open air) tobacco. Employer supplies land properly worked, implements, etc., on half shares.

A. G. V. has vacancy for farm pupil, in return for board and lodging.

F. A. W. has vacancy for farming pupil, who must pay for board.

SITUATIONS WANTED.

J. J. R. and R. W. F.—Understand farming in all its branches; long experience. Prepared to work on shares.

S. P. L.—General knowledge of farming in all branches. Six years' farming in Melsetter district, agricultural and stock. Married; no children.

J. E.—As manager or assistant. A little Home experience.

J. B.—Would like to work on shares. Seven years' experience of general farming in Cape Province.

H. B.—As farm manager. Trained at Elsenberg Agricultural College; experience in stock and dairy management, sheep, horses and cattle.

G. B.—Would like to work on shares. Four years' experience of general farming in Colesberg district, Cape Colony.

J. M.—Knowledge of stock; considerable experience with cattle in Australia.

G. L.—Assistant on farm. One year farming in Transvaal. Brought up on farm in Cape Province. Wages £3 to £5 per month, with board and lodging.

K. S.—Wishes to obtain experience on general or tobacco farm.

J. B. H.—Requires employment on tobacco farm.

J. G.—Understands horses, cattle and agriculture. Married; wife understands poultry. Would like to get on farm where he can also cultivate and keep stock for himself.

E. D. P.—Tobacco growing. One year's experience. £3 per month, and board.

P. W. P. and J. J. R.—Services in return for small salary or interest in farm. Thorough knowledge of farming in Cape Province and Free State.

B. O. M.—Would like to get on tobacco farm to gain experience.

C. J. S.—Twenty-five years of age. Six years' farming experience in Cape Province; three years with Mr. Jas. Rawbones, in charge of stock. At present farm manager and practical instructor at Elsenberg College. Would like to work a farm on percentage of profits.

P. M. W.—Prefers dairy farming; wife understands butter making and poultry. Recommended by Chairman, O.F.S. Land Settlement.

Government Notices.

ANIMALS DISEASES AMENDING ORDINANCE, 1911.

Ordinance No. 2, 1911.]

[Promulgated 17th March, 1911.

BE IT ENACTED by the Administrator of Southern Rhodesia, with the advice and consent of the Legislative Council thereof, as follows :—

1. So much of the "Animals Diseases Consolidation Ordinance, 1904" (hereinafter referred to as the said Ordinance) and of any other law as may be repugnant to or inconsistent with the provisions of this Ordinance is hereby repealed.

2. The Administrator may, on the outbreak of a destructive disease, or when there is suspicion of the existence of such disease, declare an area around and including the place where such disease exists, or is supposed to exist, actively infected for the purpose of this Ordinance.

3. Whenever an area shall have been declared infected in terms of the last preceding section, the Administrator may, for the purpose of suppressing or controlling disease, cause such fences to be erected along the boundaries of or across any farms or land situated in such area as he may deem necessary.

4. (1) If the landowner shall not pay the cost of erecting any fence as aforesaid upon completion thereof, the cost shall be defrayed in the first instance out of moneys provided by the Legislative Council.
- (2) When any fence erected as aforesaid runs along the boundary of a farm, the cost of the erection of such fence shall, if not sooner repaid, be repaid, together with interest at the rate of £5 per centum per annum, by equal yearly instalments commencing two years after the fencing is completed, such instalments being so calculated and fixed that the said cost and interest shall be wholly repaid within a period of fifteen years from the date when the first instalment became due.
- (3) Such repayment shall be made by the adjoining landowners whose land has been divided by the fence. Each such landowner shall pay one-half the cost of the dividing fence and interest as aforesaid. When the adjoining land is a native reserve, or a portion of such reserve, the one-half of the cost shall be paid from funds in the local Treasury of the British South Africa Company.
- (4) When any fence as aforesaid shall be erected within, and not on and along, the boundaries of any farm, the cost shall be paid from the funds of the local Treasury of the British South Africa Company, and the fence when no longer necessary for the purpose for which it was erected may be removed by the British South Africa Company; provided that the landowner shall have the right to purchase such internal fence at a price representing the total cost of such fence.
- (5) The term "owner" shall mean (a) the person registered as such in the office of the Registrar of Deeds, (b) the British South Africa Company in respect of native reserves, and (c) the local authority in respect of municipalities.

5. Where the bed of a stream or river lies immediately between or constitutes the boundaries of land owned by private owners, the fence may be erected on one or other bank of the river or stream and across it, or partly

on one bank, across it, and partly on the other bank, in such manner as may be agreed upon by the owners whose lands are separated by the said stream or river. The Administrator may call upon the said owners to agree to the position of the said fence on or before a date fixed by him, and, should they fail to do so, he may cause such fence to be erected without further reference to the said owners. For the purposes of repayment, such fence shall be considered as dividing the lands of adjoining owners, and half the cost shall be recoverable from each owner whose lands are separated by the said stream or river.

6. The Administrator may call upon any owner whose land has been fenced in terms of section 3 or 12 to provide sufficient security for the payment of any sums that may be due to the British South Africa Company in its local Treasury in respect of such fence. If the owner shall fail or refuse to provide such security, the Administrator may cause a notice in writing to be sent to the Registrar of Deeds of the amount due by such owner, and the Registrar shall make an entry thereof in respect of the land fenced. Such entry shall constitute an hypothecation of the land, ranking from the date on which the entry was made and for the amount therein stated; provided that the Registrar may pass transfer of land so hypothecated if the transferee agrees in writing that any sums due and unpaid shall remain and be registered as a charge against the said land.

7. When any land held under lease or permit of occupation has been fenced in terms of this Ordinance, during the term of such lease or permit the lessee or permit holder shall pay to the proprietor of such land yearly, during the continuance of the lease or permit of occupation, interest at the rate of £5 per centum upon so much of the cost of the fence as the proprietor is liable for, and such payment shall be made with the rent of the land, and shall be deemed in law to be part of such rent.

8. Any tenant or holder of land under a permit of occupation having a right to purchase such land at a fixed price shall, on completion of the purchase, pay to the proprietor, in augmentation and as part of the purchase money, any sum paid by such proprietor for the fencing of such land, and shall become and be liable to repay to the British South Africa Company in its local Treasury such sums as remain unpaid, as the same become due and payable in terms of this Ordinance.

9. Where in the case of any local authority the title to land provides that upon the sale thereof the British South Africa Company shall be entitled to receive a proportion of the purchase price, the local authority shall be entitled to deduct from the purchase price of land sold any debt due or amount paid by it in respect of fences on the land so sold erected under this Ordinance.

10. The provisions of sections 14 and 15 of the "Fencing Ordinance, 1904," in regard to repairs shall, *mutatis mutandis*, apply to fences erected in terms of this Ordinance.

11. Where a fence crosses any road used as of right by the public or by any neighbouring landowner, a properly constructed swing gate shall be placed at the point of crossing.

12. Any person opening such gate, except for the purpose of passing through, or omitting to close such gate after having passed through, and any person damaging such gate and omitting to immediately repair such damage shall be liable to a fine not exceeding £10, or in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

13. The Administrator may, for the purpose of the more effective prevention or control of disease, apply the provisions of this Ordinance in respect of fencing to municipalities and townships and such land adjoining as may be deemed expedient, and to places within a radius of ten miles of an area declared actively infected in terms of section 2 hereof, if, owing to the number of cattle in such places, or other causes, it appears expedient.

14. (1) The owner or proprietor of the land along the boundaries of which fences have already been erected by the British South Africa Company for the purpose of preventing the spread of

African Coast Fever in cattle shall be and is liable to repay to the British South Africa Company in its local Treasury one-half of the cost of so much of the fence as may be along the boundary of such land. The provisions of sections 7 and 8 of this Ordinance shall apply in the case of land held under lease or permit of occupation along the boundaries of which fences have already been erected. The British South Africa Company may remove any such fence already erected which is within and not on or along the boundaries of any land when no longer necessary for the purposes for which it was erected.

- (2) Any payment due in respect of any such fence may be made as provided by section 4 of this Ordinance, and under the like conditions as to security for such payment as are prescribed under section 6.

15. Within any area declared by the Administrator to be actively infected under the provisions of section 2, or to which the provisions of this Ordinance shall have been applied in terms of section 12, the Administrator may for the purpose of more effectively preventing the spread of disease cause to be constructed on any land a dipping tank and any structures incidental thereto or other appliances for the dipping of stock, and may recover the expenditure incurred from the owner of the land on which such tank, structures or appliances have been constructed. The cost of such tank, structures or appliances shall be paid on the same terms and under the same conditions as are applicable to boundary fences under sections 4, 6, 7 and 8 of this Ordinance.

16. In addition to any penalties that may be imposed under the said Ordinance or any amendment thereof, or under any regulations framed thereunder for the unlawful movement of cattle, the Court of the Magistrate before which the case is tried or the High Court in the like instance may direct the confiscation of any cattle unlawfully removed, and such cattle, if infected with disease or likely to convey infection, shall be destroyed without compensation. Should there be no danger of infection the Administrator may order such cattle to be temporarily kept at any spot denoted by him and then sold. The proceeds of any such sale shall be paid to the British South Africa Company in its local Treasury.

17. Section 11, sub-section (1) of the said Ordinance is hereby repealed, and in lieu thereof the following shall be the section :—

“Should any Inspector, Sub-Inspector or any person specially authorised by the Administrator to carry out the provisions of this Ordinance know or suspect that any animal is infected with any destructive disease such Inspector, Sub-Inspector or other authorised person may forthwith place such animal in quarantine, together with such land as is necessary for its isolation, and such animals as have been or are suspected of having been in contact with such animal or with infection. Notice of such quarantine shall be given in writing to the owner or custodian of such animal and to the Magistrate of the district, and shall remain in force for such time as the Chief Inspector or Controller of Stock may direct, unless the Administrator shall sooner, if he thinks fit, issue the notice referred to in sub-section (2) of section 5. A copy of the notice of any such quarantine shall be posted at the office of the Magistrate, and shall be inserted by the Magistrate in some newspaper, if any, circulating in the district.”

18. Section 16 of the said Ordinance is hereby repealed, and in lieu thereof the following shall be the section :—

“Any Government Veterinary Surgeon or any person thereto authorised by the Controller of Stock, Chief Inspector or by a Magistrate may enter any land, building, kraal or enclosure for the purpose of inspecting animals. Should any animal be found to be infected with any destructive disease, or should such infection be reasonably suspected, he may quarantine such animals as in this

Ordinance provided, and may order the proper disinfection of any building, kraal or enclosure in which such animal is or may recently have been, and the furniture and fittings thereof. Should it be impossible to properly disinfect such stable, kraal or enclosure, furniture or fittings in any of them, he may order the destruction thereof; provided that no building, kraal or enclosure shall be destroyed unless the owner consents thereto in writing, or failing such consent, the Administrator orders that such destruction be carried out."

19. Section 22, sub-section (1) of the said Ordinance is hereby amended by the addition of the following words after the word "obtained" in the twelfth line of the said sub-section, "and any person receiving or taking delivery of any animals without having ascertained that such permit has been obtained."

20. This Ordinance may be cited as the "Animals Diseases Amending Ordinance, 1911," and shall be read as one with the "Animals Diseases Consolidation Ordinance, 1904," and the "Animals Diseases Amendment Ordinance, 1910."

No. 188 of 1912.]

[6th June, 1912.]

ANIMALS DISEASES CONSOLIDATION ORDINANCE, 1904.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby amend Government Notice No. 295 of 1908 by the omission of the words "other than glanders, epizootic lymphangitis or African Coast Fever" where they occur in section 3 and in the first paragraph of Schedule "A" thereof.

No. 189 of 1912.]

[6th June, 1912.]

ANIMALS DISEASES CONSOLIDATION ORDINANCE, 1904.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that, notwithstanding the provisions of section 12 of Government Notice No. 50 of 1912, the removal of cattle for purpose of obtaining food or water may be permitted at the discretion of the Chief Inspector, and under such conditions as he may prescribe.

No. 216 of 1912.]

[4th July, 1912.]

REMOVAL OF CATTLE TO PRESCRIBED AREAS.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that, notwithstanding the provisions of Government Notices Nos. 47 and 254 of 1910 and 51 of 1911 the removal of cattle to any point within twenty miles of the border of the territory defined by the Crocodile, Shashi and Ramaquabane Rivers, to the south-east beacon of Mphoeng's extension on the last named, may be allowed until further notice under permit from the Chief Inspector for the purposes of grazing and watering.

No. 361 of 1912.]

[21st November, 1912.]

ANIMALS DISEASES CONSOLIDATION ORDINANCE, 1904.

WHEREAS it is necessary to afford facilities for transport with cattle between the Iron Mine Hill Siding area and the Umvuma Siding area as described in the Schedule to Government Notice No. 11 of 1912, I, under and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," do hereby cancel Government Notices Nos. 345 and 347 of 1912, and, notwithstanding any regulations to the contrary, declare that the above-mentioned areas shall be regarded as one for the purposes of working draught cattle for a period of three months from date hereof.

No. 50 of 1912.]

[8th February, 1912.

AFRICAN COAST FEVER.

Regulations regarding the movement of cattle and the prevention and suppression of disease.

1. UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notices Nos. 329 of 1910 and 308 of 1911 and make the following provisions in lieu thereof :—

2. The various districts of Southern Rhodesia are hereby declared an area infected with African Coast Fever for the purposes of section 5 (2) of the aforesaid Ordinance, and, save as hereinafter set out, all movement of cattle within the said districts is prohibited until further notice.

General Movement.

3. For the purpose of section 22 (1) of the said Ordinance, the following shall be regarded as places within the boundaries of which the movement of cattle may be allowed without special permission :—

- (a) Single farm.
- (b) Two or more adjoining farms, farmed together under one management and situated within one cattle transport area.
- (c) An area, the property of one owner, enclosed by a substantial fence.
- (d) For grazing purposes, an area within a radius of four miles of native kraals situated on unalienated land or in reserves, save and in so far as such area includes any private land.

The sites of such kraals shall be deemed to be the places where they are situated at the date of promulgation of these regulations.

4. Notwithstanding the provisions of the last preceding section, or of section 9 hereof, the Chief Inspector may, on the outbreak of disease, or for such other cause as may be deemed expedient, direct the isolation or quarantine of cattle on a limited area of the aforesaid places.

5. The movement of cattle from place to place may be permitted under the special permission, in writing, of an Inspector, Sub-Inspector, or other officer or person duly authorised by the Administrator to grant such permission.

6. No permission as aforesaid shall permit the movement of cattle—

- (a) Without the written consent of the owners, occupiers or managers of occupied land, and in the case of native reserves, of the Native Commissioner of the district over which land or reserve such cattle will pass, whether along roads or otherwise; provided, however, that refusal to grant such consent shall be in writing, and provided further that if the Controller of Stock or the Chief Inspector shall consider that such consent is withheld without good and sufficient cause he may permit of movement without such consent.

If any such person mentioned above refuse to give consent or to state a reason for refusing to do so in writing, no valid objection shall be deemed to exist and movement may be permitted without such written consent.

- (b) Within a veterinary district as defined in the Schedule annexed hereto from one transport area to or through another without the consent of the Cattle Inspector in charge of such area.
- (c) From any veterinary district to or through another without the consent of the District Veterinary Surgeon of such district.

Slaughter Cattle.

7. Cattle moved to any centre for slaughter under the provisions of these or any other regulations shall, on arrival, be immediately taken to such quarantine area (if any) as is provided for the purpose and immediately branded with the letters "V.D." on the near hip.

8. Cattle admitted to a quarantine area in terms of the last preceding section shall be slaughtered within twenty-one days of the date of admission, and shall not be permitted to leave the same except for the purpose of being slaughtered at the appointed abattoir, and if found outside such area, except for the said purpose, may be destroyed on the order of the Chief Inspector or Controller of Stock; provided, however, that the Chief Inspector may allow the removal of cattle from such an area under such conditions as he may prescribe.

Transport Cattle.

9. The use of cattle for draught purposes is prohibited except:—

- (1) Within the boundaries of the places defined in section 3 (a), (b) and (c) hereof.
- (2) Within the boundaries of areas already fixed for the use of cattle for draught purposes in terms of regulations published under Government Notice No. 329 of 1910, or such other areas as may be fixed by the Administrator.

10. Notwithstanding the provisions of section 9, no permit shall authorise the working of cattle

- (a) which are not clearly and distinctly branded with the registered brand of the owner;
- (b) in any wagon or vehicle which shall not have the owner's name and address legibly and permanently inscribed on the right side thereof.

11. No wagon or other vehicle drawn by oxen shall be moved from one cattle transport area into another without the permission of the Cattle Inspectors concerned, and under such conditions as they may impose.

General Provisions.

12. On the outbreak or suspected outbreak of disease, the Administrator may declare an area of infection around and embracing the place of outbreak or suspected outbreak, and a further area or areas around such area of infection as a guard area, whereupon all movement of cattle into and from place to place within such area or areas shall be immediately suspended, except as hereinafter provided.

A.—In areas of infection and guard areas:—

- (1) Cattle in transit by rail may be moved through such area.
- (2) Cattle from beyond the borders of Southern Rhodesia may be detained within such area or areas *en route* to destination.
- (3) Cattle for *bona fide* farming, dairy and slaughter purposes may be moved into such area or areas by permission of the Chief Inspector and under such conditions as he may impose.

B.—In guard areas only:—

Cattle may be moved into and from place to place within such area under the conditions of section 6 hereof.

13. The removal of green forage, hay, fodder, bedding reeds, manure or of such other articles as may be reasonably supposed capable of conveying infection, shall be prohibited from areas of infection, save and except with the special permission of the Administrator.

14. Whenever an area shall have been declared under section 12 hereof, every person within such area, or within such further area as may be specified by Government Notice, owning or in charge of cattle shall, upon the death

or slaughter because of disease, suspected disease, or accident, of any such cattle, immediately report such occurrence through the nearest Cattle Inspector, Native Commissioner or Police Officer to the District Veterinary Surgeon.

15. Notwithstanding the provisions of these regulations, it shall be competent for the Chief Inspector of Cattle to authorise and direct the movement of cattle for the purposes of isolating, dipping, quarantine, or any other such objects as may be deemed necessary to prevent or suppress an outbreak of disease.

16. Whenever an area shall have been declared an area of infection or guard area in terms of section 12 hereof, any person who shall allow any cattle to stray or be otherwise removed, except as provided for in these regulations, from any one place within such area to another place, or from a place outside of to a place within such area, shall be guilty of an offence against these regulations.

17. All cattle within the limits of the various commonages and townlands, areas of infection and guard areas as declared under section 12 hereof, or depastured on common grazing ground, shall be dipped or sprayed at least once in every three days, unless the Chief Inspector shall authorise the extension of the time between such dipping or spraying, or the entire suspension of the same.

18. In all areas of infection and guard areas sheep and goats shall be dipped at such periods as may be directed by the Chief Inspector.

19. Whenever the owner, occupier, or manager of a farm shall adopt means of cleansing cattle running thereon, either by spraying, dipping, or by any other method, the Chief Inspector may order any natives or other persons having cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district within which the farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

20. All permits for the removal of cattle issued under the provisions of the said Ordinance or of any regulations framed thereunder shall specify legibly and clearly on the face thereof the place from and to which such cattle may be removed, the route by which they shall travel, the number and brands of such cattle, the time allowed for the journey, and such other particulars and conditions as it may be deemed expedient to provide.

21. No permit issued for the movement of cattle shall be taken to authorise any trespass in connection with such movement.

22. Notwithstanding the provisions of these regulations, it shall not be lawful for any owner of cattle to allow any such cattle to be on any road, public outspan, commonage, or any property other than that of the owner, unless they are free from ticks or unless they have been effectively cleansed by dipping, spraying or other process, within fourteen days of being allowed on such road or other place. Any beast having ten or more ticks on it shall not be considered free from ticks.

23. Any person contravening the provisions of these regulations or the conditions set out in permits issued thereunder, shall, where no higher penalty has been by the said Ordinance or any other law provided, be liable in respect of each offence to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months.

SCHEDULE "A."

VETERINARY DISTRICTS OF SOUTHERN RHODESIA.

(1) Salisbury.

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

32. Battlefields; 33. Hartley and Gatooma; 34. Gadzema Station; 35. Makwiro Station; 36. Norton Siding; 37. Hunyani Tank; 38. 1645½ Peg B. & M. & R. Railways; 39. Salisbury A.; 40. Salisbury B.; 41. Salisbury C.; 42. Salisbury D.; 43. Arcturus; 44. Bromley; 45. Marandellas North; 46. Marandellas South; 48. Headlands Station; 49. Junction Mazoe and Lomagundi Railways; 50. 23-Mile Peg, Lomagundi Railway; 51. Passaford Station; 52. 35-Mile Peg, Lomagundi Railway; 53. Gwibi Tank Halt; 54. Banket, Lomagundi; 55. Eldorado, Lomagundi; 56. Selby Siding; 57. Mazoe; and 58. Kimberley Reefs.

(2) *Bulawayo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912:—

1. Plumtree; 2. Marula Siding; 3. Figtree; 4. Westacre Junction; 5. Bulawayo Area; 6. Heaney Junction; 7. Bembesi Station; 8. Insiza North; 9. Insiza South; 10. Shangani North; 11. Shangani South; 14. Redbank; 15. Nyamandhlovu Station; 16. Malindi Station; 17. Wankies Area; 18. Matetsi Siding; 19. Matopo Terminus; 20. Sabiwa Siding; 21. Gwanda Station; 22. West Nicholson; 23. Belingwe; 59. Essexvale and Balla Balla Areas; 60. Stanmore Siding Area; 61. Filabusi Area.

(3) *Gwelo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912:—

12. Somabula Siding; 13. Gwelo Station; 24. Selukwe Area; 25. Surprise Area; 26. Indiva Siding; 27. Lalapanzi; 28. Iron Mine Hill Siding; 29. Umvuma Siding; 31. Que Que Station.

(4) *Umtali.*

An area comprising the native districts of Umtali, Melsetter, Makoni and Inyanga.

No. 175 of 1912.]

[30th May, 1912.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that, notwithstanding the provisions of Government Notices Nos. 47 and 254 of 1910 (and 51 of 1911), the removal of cattle to within that portion of the prescribed areas westward of the Salt River, Tuli district, may be allowed under permit from the Chief Inspector, for the purposes of grazing and watering.

No. 233 of 1912.]

[11th July, 1912.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notice No. 127 of 1910, in so far as it relates to the Protectorate of Nyasaland, and further do hereby prohibit the introduction into Southern Rhodesia of cattle from Nyasaland until further notice.

No. 252 of 1912.]

[1st August, 1912.

AFRICAN COAST FEVER. TRANSPORT AREAS.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 9 of the regulations published under Government Notice No. 50 of 1912, declare the areas described in the subjoined Schedule as areas within which the use of cattle for draught purposes may be permitted.

SCHEDULE.

62. *Mazi Siding.*

An area including the farms Cheronga, Highfield, Kirbyvale, Mona, Dyffryn, Maidstone, Harrisonville, Recondite and Crofton.

63. *Inyazura Siding.*

An area bounded by and including the following farms:—Inyamapamberi Outspan, Tiny, Marngu, Mount Zonga Commonage, Mount Zonga, Kwapassi Outspan, Orowati, Tableview, Tsungwesi Source, Tsungwesi Ridge, Everton, and the unsurveyed land lying east of a line drawn from the north-west beacon of Everton to the south-west beacon of Tiny.

64. *Igusi Siding.*

An area bounded by and including the following:—Winter, Spring, Eland, Buda Block No. 2, Grant, Batley, Groote Schuur No. 2, Frankland, Fry's Farm, Goshen Flat, Uhlanulu, Ubusiga, Ughwindhla, Ihlobo, Woodlands, Teakdale, Barn Park, Forest Hill, Groote Schuur, Majindan, Mvuba, Barwon, Campaspe, Esperanza, Merryland and Maraposa.

65. *Gwaai Area.*

An area bounded by the Malinda area, the Bechuanaland border, the Plumtree, Nyamandhlovu, Igusi Siding, Bembesi, Shangani North and Gwelo areas, from the most northerly point of the latter down the Shangani River to the western boundary of the Shangani Reserve, thence in a southerly direction along the same to the Gwampa River and down this river to the Malinda area.

No. 338 of 1912.]

[24th October, 1912.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 213 of 1912, and, in terms of section 12 of Government Notice No. 50 of 1912, declare the following areas of infection and guard areas for the purposes of the said Ordinance:—

(1) NATIVE DISTRICTS OF UMZINGWANE, BULAWAYO, MATOBO AND BUBI.

(a) *Areas of Infection.*

The farms Alnwick, Nyorka, Induba, Collaton, Irene, Maboqutwaneni Outspan, that portion of the Essexvale Estate, known as the North Paddock, which adjoins the farm Ballarat on its eastern boundary, and the fenced subdivision of Bulawayo Commonage, which includes the township, suburbs and Hillside.

(b) *Guard Area.*

An area bounded by and including the following farms:—Lochard Block, Half Ration Rancho, Chilton, Fincham's, Inyati Reserve, Huntsman, Robert Block, Induna, Waterfall, Dineaan, Rouxdale, Fundisi, Helenvale (excluding farms Nos. 1, 3 and 16), Sights, Bilars, Stonycroft, Craiglee, Blewbonny, Ireland, Welcome, Springvale, Vriegezicht, Paul's Rest, McGeer's Luck, Centenary Mission, Outspan No. 3, Anglesea, Mineral King, World's View, Matopo Block, Mission Farm Brethren in Christ, Absent, that portion of the Matopos lying north of a line drawn from the south-eastern beacon of Absent to the north-western beacon of Longfield, The Range, Clarke's, Swaithe's, Limerick, Pioneer's Rest, Havhill, Rietfontein, Bradford, Hamilton, Mayfair, York, Induna, Rathline, Westondale, Sub-Division "A," Fochabers, Kodhwayo, Zimbile and Lochard Outspan.

(2) NATIVE DISTRICT OF SALISBURY.

(a) *Area of Infection.*

Salisbury Commonage.

(b) *Guard Area.*

1. The farms Gillingham and Rainham.
2. The farms Avondale, Mount Pleasant, and Nursery.

(3) NATIVE DISTRICT OF UMTALI.

(a) *Area of Infection.*

Umtali Commonage.

(b) *Guard Area.*

An area bounded by and including the unsurveyed land known as Penhalonga Valley, the farms Dupris, Ferndale, Fairholme, Barrydale, from the north-western beacon of the latter along the eastern boundaries of the Premier Estate, Mtikas and the Dairy, thence by and including the farms Wiermouth, Raheen, Fern Valley, and Fernhill to the Anglo-Portuguese boundary, thence along this boundary in a northerly direction to the first-named place.

(4) NATIVE DISTRICT OF MELSETTER.

Guard Area.

The farms Tilbury and Dunstan.

(5) NATIVE DISTRICTS OF MAKONI AND INYANGA.

Guard Areas.

The Makoni Reserve and the farms Makoni Kop, Lesapi Drift, Lesapi Valley, Dombo Outspan, Inyangura, Notgotimyet, Timaru, Rodel, Liverpool, York, Foxhill, Inyangonibe and Inyanga Valley.

No. 342 of 1912.]

[24th October, 1912.

TRANSPORT AREAS.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 9 of the Regulations published under Government Notice No. 50 of 1912, declare that, until further notice, the main road between the Tokwe and Ngesi Rivers is included in Area No. 24, Government Notice No. 11 of 1912, and the use of cattle for draught purposes is therefore permitted up to the Ngesi River upon the said road.

SUMMARY OF THE "GAME LAW CONSOLIDATION ORDINANCE, 1906," AND REGULATIONS ISSUED THEREUNDER.

The Ordinance divides the game into three distinct classes, described as follows:—

- (a) Birds and Small Buck.
- (b) Bushbuck, Hartebeest, Impala, Lechwe, Pookoo, Roan and Sable Antelope, Sitatunga, Tsessebe, Waterbuck, and Wildebeest.
- (c) Royal Game, which includes Eland, Elephant, Giraffe, Gemsbok, Hippopotamus, Inyala, Koodoo, Ostrich, Rhinoceros, Springbuck and Zebra.

The shooting season for Class "A" is as follows:—

In Mashonaland:

Birds from 1st May to 30th September.

Small Buck from 1st May to 31st October.

In Matabeleland:

Birds and Small Buck from 1st May to 31st October.

To shoot in Class "A" a licence costing £1 per annum is required. This entitles holders to hunt in both Provinces during the open season.

Class "B."—The season opens on 1st July and closes on 30th November in both Provinces. The licence fee is £25 for non-residents and £5 for persons having their domicile in Southern Rhodesia. This licence entitles the holder to shoot up to 15 head, which number may be increased to a total of 25 upon payment of a further sum of £15 in the one case and £5 in the other.

Class "C."—The Administrator may, if he is satisfied that the animals are actually required for scientific purposes, grant to the holder of a game licence permission to shoot or capture any of the species included in this Class. Such permit requires a £5 stamp. Applications in writing, together with proof of *bona-fides*, should be addressed to the Director of Agriculture.

Game for Farming Purposes.—Permits are granted for the capture of Eland, Ostrich, Zebra or other animals for the purposes of breeding or farming. Such permits require a stamp of the value of £1 and remain in force for six months. Application, accompanied by a sworn declaration, should be made through the Director of Agriculture or the Civil Commissioner of the district.

Game Injuring Crops.—The occupier of any cultivated land or any person acting under the authority of such occupier, may at any time destroy game actually doing damage on such land.

Elephants on Occupied Farms, Melsetter.—The destruction of Elephants when found on occupied farms on the High Veld in Melsetter District is authorised (*vide* Government Notice No. 284 of 1908).

Tsetse Fly, Hartley District.—Government Notice No. 201 of 1912 withdraws the Close Season for Class "B" until 30th June, 1913, in the area in the Hartley district bounded as follows:—From the Railway bridge on the Umfuli River, thence north-westwards along the Umfuli River to where it joins the Umniati River, thence southwards along the Umniati River to where it joins the Umsweswe River, thence eastwards along the Umsweswe River up to the drift at the Lydia Mine, thence along the old road from Lydia Mine to Etna Mine and to Inez Mine, thence northwards along the road from Inez Mine to Hartley, thence in the direction of the Railway bridge to the starting point on the Umfuli River. This notice also transfers from Class "C" to Class "B" Eland, Koodoo, and Zebra so far as that area is concerned. Under Government Notice No. 120 of 1909 game in Class "B" may be shot without a licence in this area.

Game in Class "A" may be hunted in the close season until further notice on private land in the Melsetter district by holders of a licence.

Protected Areas.—No game may be hunted or killed within the limits of the Commonage or Townlands of Bulawayo and within a radius of two miles of the Court House, Gwelo, or within the Urungwe Game Sanctuary, as defined by Government Notice No. 237 of 1906.

"Locust Birds" are strictly protected, *vide* Government Notice No. 121 of 1907.

Export of Game.—No living Game or the Eggs of any Game Birds may be exported beyond the limits of Southern Rhodesia without a written permit.

Shooting on Private Land.—A licence does not entitle the holder thereof to shoot on private land without the permission of the land-owner.

No. 243 of 1912.]

[18th July, 1912.]

GAME LAW CONSOLIDATION ORDINANCE, 1906.

UNDER and by virtue of the powers vested in me by section 4 (2) of the "Game Law Consolidation Ordinance, 1906," I do hereby suspend the operation of the said Ordinance, in so far as it relates to the destruction of hippopotami, on the farms Impofhoe and Hippovale, in the district of Hartley, and in such portions of the rivers Serui and Umfuli as are contiguous to the said farms, for a period of one year from the 19th July, 1912.

No. 296 of 1912.]

[5th September, 1912.

GAME LAW CONSOLIDATION ORDINANCE, 1906.

UNDER and by virtue of the powers vested in me by the "Game Law Consolidation Ordinance, 1906," I do hereby cancel Government Notice No. 54 of 1910, which suspended the operation of the said Ordinance as to a portion of the Marandellas district, within an area extending one mile outwards from the African Coast Fever Cordon Fence, in respect of sable antelope, tsessebe, eland and koodoo.

No. 297 of 1912.]

[5th September, 1912.

GAME LAW CONSOLIDATION ORDINANCE, 1906.

UNDER and by virtue of the powers vested in me by section 4 (2) of the "Game Law Consolidation Ordinance, 1906," I do hereby suspend the operation of the said Ordinance in so far as it relates to the killing, hunting or capture of game in Class "A" in the native district of Chibi, for a period of six months from the date hereof.

No. 310 of 1912.]

[26th September, 1912.

GAME LAW CONSOLIDATION ORDINANCE, 1906.

UNDER and by virtue of the powers vested in me by section 4 (2) of the "Game Law Consolidation Ordinance, 1906," I do hereby suspend the operation of the said Ordinance, in so far as it relates to the killing, hunting or capture of game in Class "A," in the district of Melsetter south of a line running from the north-west beacon of the farm Gunera, along the southern boundary of Musikivatu reserve to where it intersects the western boundary of the farm Chikore, thence along the eastern boundaries of the farms Mhungura and Passage, and thence to beacon 100A on the Portuguese border, for a period of six months from the date hereof.

No. 110 of 1908.]

[16th April, 1908.

IMPORTATION OF CATTLE.

UNDER and by virtue of the powers conferred on me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and repeal so much of the Regulations published under Government Notice No. 187, dated the 26th of July, 1906, as relate to the importation of cattle from the Colony of the Cape of Good Hope and the United Kingdom of Great Britain and Ireland, and make the following provisions in lieu thereof:—

1. The importation of cattle may be permitted from the Colony of the Cape of Good Hope and the Orange River Colony on the following terms and conditions—

- (1) A permit shall be required from the Chief Inspector which may contain such conditions as shall from time to time appear expedient.
- (2) Applications for permission to import shall be in the Form "A" attached hereto, and accompanied by a declaration in the annexed Form "B."
- (3) The importation of cattle with more than two permanent central incisor teeth shall not be permitted.
- (4) All importations shall be by rail and for the purposes thereof Bulawayo shall be regarded as the port of entry.
- (5) All cattle imported in terms of these Regulations shall on arrival at Bulawayo, Salisbury, or Umtali be removed to a place of quarantine under the supervision of an Inspector of Cattle, there to be submitted to such examination and tests as the Chief Inspector may direct. If such examination or tests disclose the

existence of any destructive disease the cattle shall be immediately destroyed and the carcasses thereof disposed of in such manner as a Government Veterinary Surgeon may authorise or require. The Chief Inspector may permit of any examination or tests as aforesaid being dispensed with in the case of cattle in transit by rail for any place beyond the boundaries of Southern Rhodesia.

- (6) All expenses or losses incident to quarantine, examination, testing or destruction as aforesaid shall be borne by the owner of the cattle.

2. The importation of cattle from the United Kingdom of Great Britain and Ireland may be permitted under the following terms and conditions—

- (1) Importation shall be through and direct from the coast ports of the Cape Colony, and there shall be a consignment note or other satisfactory evidence that cattle so imported have come direct from Great Britain or Ireland.

- (2) The provisions of sub-sections (5) and (6) of section 1 hereof shall apply to importations in terms of this section.

3. No person shall import cattle in terms of these Regulations except for his own use, provided however that permission may be granted to import for others on the applicant disclosing the name of the person or persons for whom he proposes to act.

4. Any person introducing cattle in contravention of these Regulations, or failing to comply with any conditions attached to permits to import, or furnishing applications, declarations, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, testing, destruction or disposal of carcasses, shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months, unless higher or greater penalties shall have been provided for such offences by the "Animals Diseases Consolidation Ordinance, 1904," provided however that the penalties imposed by these Regulations shall not exempt any cattle from destruction in terms of the aforesaid Ordinance.

ANNEXURE "A."

APPLICATION FOR CATTLE IMPORTATION PERMIT.

1. Applicant's Name and Address.....
2. Number and Class of Cattle to be imported.....
3. Area or Farm and District where Cattle are at present located.....
4. Area or Farm and District to which Cattle are to be moved.....

Applicant's Signature.....

Date.....

Application.....

Permit No.....

ANNEXURE "B."

I,
 residing on the farm
 in do solemnly and sincerely
 declare that the (number in
 writing) animals also enumerated below have been in my possession since
 birth, and that lung sickness, pleuro-pneumonia or other contagious or
 infectious disease has not existed amongst any of my cattle, nor on my
 farm, nor among any cattle with which these animals have been in contact
 within the last four years, and that these animals have never been exposed
 for sale in any public market or stock fair, nor been in contact with strange
 cattle, and that to the best of my knowledge and belief such cattle in
 travelling to Station (*i.e.*, station where cattle
 are to be trucked) will not come into contact with any animals amongst
 which lung sickness or any other contagious or infectious disease has existed
 during that period.

Number of Animals Bulls Heifers

Breed

Seller's Name and Address

Purchaser's Name

Place in Southern Rhodesia to which animals are being sent

And I make this solemn declaration conscientiously believing the same to
 be true.

Declared to at on this
 day of before me,

Resident Magistrate for the district of

No. 211 of 1910.]

[4th August, 1910.]

IMPORTATION OF CATTLE FROM NORTH-WESTERN RHODESIA.

UNDER and by virtue of the powers vested in me by the "Animals
 Diseases Consolidation Ordinance, 1904," I do hereby declare and make
 known that, notwithstanding the prohibition contained in Government
 Notice No. 89 of 1908, the importation of cattle from North-Western
 Rhodesia may be permitted under the following terms and conditions:—

1. The permission of the Chief Inspector of Cattle shall be first had
 and obtained.

2. All cattle shall be introduced (a) by rail via the Victoria Falls, or (b)
 by way of the town or port of Feira, which are hereby declared to be ports
 of entry.

3. All applications for permission to import shall be accompanied by a
 certificate by a Government Veterinary Surgeon of North-Western Rhodesia
 that—

(a) the districts from which they come and through which they pass
 are free from contagious diseases of animals;

(b) the animals in respect of which the application is being made
 have been examined and are free from contagious diseases of
 animals.

4. All cattle shall on entry be taken, where possible by rail, to such
 quarantine area and shall remain in quarantine for such period as the Chief
 Inspector of Cattle shall direct, but not less than three months.

5. Any person found introducing cattle in contravention of these regulations, or failing to comply with any of the conditions attached to permits to import, or furnishing applications, certificates, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, etc., shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months; provided, however, that the penalties imposed by these regulations shall not exempt from liability to penalties, forfeiture, or destruction, elsewhere provided for.

ANNEXURE "A."

Certificates under Section 3.

(a) I hereby certify that I have examined the following cattle belonging to Mr.

.....cows and heifers,

.....calves,

.....oxen and bulls,

and that the districts from which they come and through which they will pass in this Territory *en route* to Southern Rhodesia are to the best of my knowledge free from all destructive diseases of cattle.

Signed.....

Government Veterinary Surgeon.

(b) I hereby certify that I have examined the following animals belonging to Mr.

.....cows and heifers,

.....calves,

.....oxen and bulls.

In my opinion these animals are free from all destructive diseases.

Signed.....

Government Veterinary Surgeon.

NOTE.—All numbers are to be expressed in words.

IMPORTATION OF CATTLE FROM GREAT BRITAIN.

OWING to an outbreak of Foot and Mouth Disease no permits for importation of cattle from Great Britain into Southern Rhodesia will be granted until further notice.

No. 391 of 1908.]

[17th December, 1908.

BRANDS ORDINANCE AMENDMENT ORDINANCE, 1908.

UNDER and by virtue of the powers vested in me by the "Brands Ordinance, 1900," as amended by the "Brands Ordinance Amendment Ordinance, 1908," I do hereby cancel and withdraw the Regulations published under Government Notice No. 204 of 1900, and declare the following shall be in force in lieu thereof, from and after the 7th January, 1909:—

1. The Registrar of Brands shall have his office in the Agricultural Department. With the exception of the Magistrate of Salisbury, the Magistrate in each district of Southern Rhodesia, and the Assistant Magistrate in each sub-district, shall be a deputy Registrar of Brands for the magisterial district or sub-district to which he is appointed. The offices of the Deputy Registrars of Brands shall be the offices of the several Magistrates.

2. (a) The form of application for registration of a brand shall be that marked "A" in the Schedule attached to this Notice.
- (b) The form of a certificate of registration shall be that marked "B" in the said Schedule.
- (c) The form of a transfer of a brand from one registered proprietor to another shall be that marked "C" in the said Schedule.
- (d) The form of a certificate of such transfer shall be that marked "D" in the said Schedule.

3. Each Deputy Registrar of Brands shall keep a register, in the form of Schedule "E" hereto, of all brands allotted within his district under the provisions of the Ordinance.

4. Save as hereinafter provided, every registered brand shall consist of two letters and a numeral of plain and uniform pattern; and the first of the letters shall indicate the magisterial district or sub-district in which the holding is situate on which the brand is to be used, and shall be placed above the numeral and letter comprising the brand, so as to be in triangular form.

5. One brand and no more shall be allotted to any person in one magisterial district or sub-district.

6. The size of the characters branded on stock shall not be more than three inches in height nor more than two inches in width.

7. An applicant for a brand shall be allotted the next vacant brand assigned to the district in which he is located, as set forth in Schedule "F" hereof.

8. Each Deputy Registrar shall keep a list of brands assigned to his district, for the inspection of applicants for brands.

9. There shall be payable to the Registrar or Deputy Registrar—

- (a) For every separate registration of a brand, 5s.
- (b) For every transfer of a brand, 5s.

10. All brands shall be imprinted on stock as follows:—

- (a) In the case of horses, mules or donkeys, the first brand shall be imprinted either on the near side of the neck or near rump, and any second or subsequent brand shall (where there is sufficient space for such purpose) be imprinted on the same part of such animal, and at a distance of not less than one and a half inches from and directly underneath last imprint, according to the table herein set forth.

Where there is not sufficient space for the purpose, then such second or subsequent brand shall be imprinted on the part of such animal next in order, according to the following table:—

- i. Off Neck or Rump (or Thigh);
- ii. Near Shoulder (or Top of Arm);
- iii. Off Shoulder (or Top of Arm).

- (b) In the case of cattle, the first brand shall be imprinted on the near rump or thigh of the animal, and every second or subsequent brand shall be imprinted at a distance of not less than one and a half inches from and directly underneath the brand last imprinted, according to the following table:—

- i. Off Rump (or Thigh);
- ii. Near Shoulder (or Top of Arm);
- iii. Off Shoulder (or Top of Arm).

- (c) In the case of sheep and goats, the first brand shall be imprinted on the near shoulder, and all second or subsequent brands in the following order:—

- i. On Near Side or Ribs;
- ii. Near Rump (or Thigh);
- iii. Off Shoulder;
- iv. Off Side or Ribs;
- v. Off Rump (or Thigh).

(d) In the case of ostriches:—

- i. On Near Thigh;
- ii. On Off Thigh.

11. Each proprietor of a registered brand shall have the right, in addition to imprinting his brand in the manner above prescribed, to place such brand on the ears of such animals by punching, tattooing or ear-rivets.

12. The owner of any brand may surrender the same, and the Registrar shall, on receipt of notice thereof, cancel the registration by notice in the *Gazette*.

13. When it appears to the Registrar, upon the report of a Deputy Registrar, Native Commissioner, or Cattle Inspector, that a registered brand is not in use, he may cause notice thereof to be given to the owner thereof, calling upon him to shew cause why the same should not be cancelled; if cause is not shewn to the satisfaction of the Registrar within six months after such notice, he may cancel the brand.

14. No brand which has been surrendered or cancelled shall be re-allotted until a period of five years from such surrender or cancellation has elapsed.

15. The Registrar shall, at the end of each quarter in every year, or as soon thereafter as possible, transmit for publication in the *Gazette* a statement, in the form of Schedule "E" hereto, of all brands registered under the Ordinance up to the last day of such quarter.

16. The Registrar shall allot a brand to every public pound already or hereafter to be established, and shall register the same.

The first character of every such brand shall be a diamond, and the second the dominant letter of the magisterial district or sub-district, and the third a numeral, the dominant letter to be placed above the diamond and numeral, so as to form a triangle; and the Poundmaster shall, on sale of any stock impounded therein, brand the same with such brand on the portions and in the order prescribed in these Regulations, to shew that the said brand is the last brand at that time imprinted on such stock; and any Poundmaster who shall fail to comply with the provisions of this section shall on conviction be liable to a fine not exceeding £5.

No. 311 of 1912.]

[26th September, 1912.

BRANDS ORDINANCE, 1900.

UNDER and by virtue of the powers vested in me by "The Brands Ordinance, 1900," as amended by the "Brands Ordinance Amendment Ordinance, 1908," I do hereby declare that the following districts have been added to those shewn in Schedule "F" of Government Notice No. 391 of 1908, and brands allotted as under:—

Dominant Letter or Numeral.	District Denoted.	Brands Series.	And variations
		4	
4	Nyamandhlovu	A A 4 Z Z	And variations
5	Umzingwane	5 A A 5 Z Z	

No. 328 of 1912.]

[17th October, 1912.]

"FENCING ORDINANCE, 1904": LOMAGUNDI NATIVE DISTRICT.

UNDER and by virtue of the powers conferred on me by the "Fencing Ordinance, 1904," I do hereby define the Lomagundi native district to be a district for the purpose of the said Ordinance, and, in terms of section 4 thereof, bring the provisions of the said Ordinance into operation in the aforesaid district.

No. 45 of 1909.]

[13th March, 1909.]

RABIES.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw the Regulations promulgated by Government Notices Nos. 42, 156 and 228 of 1907, except as to acts done or penalties incurred at the date of the coming into force of this Notice, and except as to officers appointed under Government Notice No. 286 of 1906, whose appointments shall remain valid for the purposes of this Notice, and declare the following Regulations shall have full force and effect in lieu thereof:—

1. All and several the various native districts of Southern Rhodesia are hereby declared to be areas infected with the disease of rabies.

2. Subject to any penalty a dog owner may have incurred under Government Notice No. 285 of 1906 by not registering his dog before the first day of February, 1907, the owner of any unregistered dog liable to registration may register the same at any time after the said date.

3. On and after the date of this Notice becoming operative the owner of every dog arriving at the age of three months, and the owner of every dog imported into Southern Rhodesia after that date, shall register such dog with an official appointed for that purpose, provided that this provision shall not apply to any municipality, township or similar area in which provision for registration exists and is duly enforced.

4. A registration badge shall be issued for each and every dog registered, and the said badge shall be attached to a proper and sufficient collar to be supplied by the owner, which must be placed and kept on each dog registered.

5. A fee to cover the cost of registration and supply of badge in the amount of sixpence will become demandable and payable on registration of each dog.

6. Any dog found at large after the date of this Notice becoming operative, not having and bearing a registration badge duly issued by an official or the local authority, may be summarily destroyed by any person.

7. Any Magistrate, Police Officer, Native Commissioner, Government Veterinary Surgeon, or other official vested with the performance of functions under the "Animals Diseases Consolidation Ordinance, 1904," may, on it appearing to him that any dog or other animal is shewing symptoms which justify investigation as to whether such dog or animal is suffering from rabies or not, order the proper detention, isolation and control of such dog or animal, either in the hands of the owner or at some other suitable place.

8. Should any dog shew symptoms which lead to the suspicion that such dog may be suffering from rabies, the owner thereof shall forthwith notify the fact to the nearest official vested with powers under these Regulations, who shall immediately report the same to the Chief Veterinary Surgeon, and shall either destroy the said dog or isolate and secure it for further observations.

9. On its appearing that any animal is actually suffering from rabies, any of the abovementioned officials may order the destruction of such animal, or may himself destroy it, and may further take control of or destroy, if deemed necessary, any animal which has been in contact with a rabid animal or an animal suspected of being rabid.

10. The carcasses of all animals destroyed on account of their being infected with rabies shall be thoroughly burnt by the person or official destroying them, save that such parts as may be required for scientific investigation may be retained under proper precautions. In any case in which a human being has been bitten by a rabid animal, the head of such animal shall, if possible, be taken and sent to the nearest veterinary official.

11. (1) In the event of an outbreak of rabies occurring, the Administrator may by notice in the *Gazette* direct that all dogs within a radius of fifteen miles of such outbreak, or such other area as may be fixed, shall be kept in a safe enclosure or chained up for a period of not less than six weeks from such notification, or such other period as may be fixed, but may be taken out for exercise if kept on a chain or leash by the person exercising them.

(2) In the event of a suspected outbreak of rabies occurring, the Magistrate of a district may, and at the request of the Chief Inspector of Stock shall, direct that all dogs within a radius of fifteen miles, or such other area as may be deemed necessary, shall be kept in a safe enclosure or chained up for a period not exceeding four weeks, but may be taken out for exercise if kept on a leash or chain by the person exercising them.

(3) No dog shall be removed from any proclaimed area during such periods of quarantine.

12. Any dog found at large in a notified area at any time during the prescribed period may be summarily destroyed by any person, and the owner or person responsible for the custody of such dog shall be liable to the penalty hereinafter laid down.

13. Any person contravening any of the above Regulations, or failing to carry out any of the provisions thereof, shall be liable, on conviction, to a fine not exceeding £10 for each offence; or, in default of payment, to imprisonment, with or without hard labour, for a period not exceeding one month.

No. 336 of 1911.]

[26th October, 1911.]

RABIES.

THE following instructions regarding the treatment of persons bitten by rabid animals are published for general information.

In every case where a person has been bitten by a dog or other animal known or suspected to be rabid, the following precautions are recommended:—

- (1) The wound should be immediately and thoroughly cauterised. This, if it does not altogether prevent the disease, delays its onset sufficiently for Pasteur treatment to be successfully applied.
- (2) The patient should be sent to Salisbury for treatment at once. Delays are dangerous.
- (3) The fullest information should be sent to the Health Department as to date when bitten, locality, fate of dog, and especially reasons for supposing the dog to be mad.

[1st July, 1912.]

RABIES.

SEVERAL cases have recently occurred where dogs having bitten a person or persons, were immediately destroyed and report made that they were possibly infected with rabies. In such cases it is impossible for the Veterinary Department to say in less than 18 to 20 days whether the animals were infected or not, and then only when the head of the dog concerned is received at the laboratory in a good state of preservation. Thus valuable time is lost in the treatment of persons bitten, which may lead to fatal results.

In all cases the suspected animal should, if possible, be secured by a strong collar and chain and the circumstances reported by telegram to "Veteran," Salisbury, when full instructions will be given as to the treatment and observation of the suspected animal.

No. 329 of 1912.]

[17th October, 1912.]

RABIES.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare the provisions of sections 1 and 3 of Government Notice No. 260 of 1912 to be in force in the following area in Hartley district for a period of three months from date of publication hereof :—From the junction of the Umsweswe and Umniati Rivers up the former to where it crosses the old Hunters' Road, thence down this road to the Umniati River, thence down the Umniati River to the point first mentioned.

No. 240 of 1910.]

[1st September, 1910.]

INSECT PESTS.

UNDER and by virtue of the powers vested in me by the "Nurseries Ordinance, 1909," I hereby proclaim the undermentioned insects to be pests within the meaning of the said Ordinance :—

- The Red Scale (*Chrysomphalus aurantii*).
- The Oleander Scale (*C. hederæ*).
- The Circular Purple Scale (*C. aonidum*).
- Ross's Black Scale (*C. rossi*).
- The Purple or Mussel Scale (*Lepidosaphes beckii*).
- The Long Scale (*L. gloverii*).
- The White Peach Scale (*Aulacaspis pentagona*).
- Woolly Aphis or American Blight (*Schizoneura lanigera*).

No. 228 of 1912.]

[11th July, 1912.]

IMPORTATION OF PLANTS REGULATION ORDINANCE, 1904.

UNDER and by virtue of the powers vested in me by the "Importation of Plants Regulation Ordinance, 1904," I do hereby declare and make known that Government Notices No. 306 of 1911 and No. 35 of 1912 are hereby repealed, and section 17 of the Regulations published under Government Notice No. 141 of 1906 is hereby repealed and the following regulation substituted in lieu thereof :—

- "17. The introduction into Southern Rhodesia of any plant, not being seed, fruit, bulb, tuber, cut flower, vegetable or vegetable transplant originating in the Union of South Africa, not grown in a nursery registered at the Department of Agriculture, Pretoria, under the 'Agricultural Pests Act, 1911,' is prohibited, except under special permission from the Director of Agriculture, Salisbury, Southern Rhodesia, who may impose such conditions in regard to such importation as he may think fit."

No. 282 of 1912.]

[22nd August, 1912.

IMPORTATION OF PLANTS REGULATION ORDINANCE, 1904.

IT is hereby notified for public information that His Honour the Administrator has been pleased to appoint Richard Lowe Thompson, Esquire, to be an Inspector for the purpose of carrying out the provisions of the "Importation of Plants Regulation Ordinance, 1904," and of the "Nurseries Ordinance, 1909."

No. 319 of 1912.]

[3rd October, 1912.

IMPORTATION OF POTATOES INTO SOUTHERN RHODESIA.

UNDER and by virtue of the powers vested in me by the "Importation of Plants Regulation Ordinance, 1904," I do hereby cancel the regulations published under Government Notice No. 309 of 1909, and do substitute the following in lieu thereof :—

(1) No person shall introduce into Southern Rhodesia from outside British South Africa any consignment of potatoes unless accompanied by a statement on oath from the consignor stating fully in what country, and district of that country, the potatoes were grown, and a certificate from the Department of Agriculture or other responsible Government body or official institution of that country to the effect that the disease known as "warty disease" or "black scab," caused by the fungus *synchytrium endobioticum* Percival, is not known to occur on the farm or premises on which the potatoes were grown. Any consignment not accompanied by such documents will be liable to be seized and destroyed.

(2) Any consignment of potatoes imported from other parts of South Africa or from overseas, if found on inspection to be infested with the pest known as "root gall worm" (*heilerodera radicola*) will be refused admittance to Southern Rhodesia or destroyed.

(3) Should any consignment on arrival be found to be infested with "warty disease" or "black scab," it will be totally destroyed.

(4) Any person guilty of a contravention of these regulations will be liable to a fine not exceeding £10.

No. 249 of 1908.]

[27th August, 1908.

PROTECTION OF TREES.

IT is hereby notified for public information that any person who shall cut down for use as fuel, or for any other purposes than *bona-fide* farming, mining or manufacturing purposes, or cause to be so cut down the "Wild Westeria" (native name M'Pakwa or M'poea) tree, will be liable to prosecution for contravention of the provisions of the Forest and Herbage Preservation Act, 1859, and upon conviction to a fine not exceeding £100, or to imprisonment with or without hard labour for a term not exceeding six months, or to such fine and imprisonment, or to such imprisonment without a fine.

Department of Posts and Telegraphs, Southern Rhodesia.

Postal Notice No. 24 of 1909.

AGRICULTURAL PARCELS POST.

IT is hereby notified for public information that, on and after the 1st August, 1909, any article produced, and, if manufactured, produced and manufactured within Southern Rhodesia may be transmitted by Agricultural Parcels Post at the reduced rate of sixpence for the first lb., and threepence for each subsequent lb. or fraction thereof, up to a limit of eleven lbs. in weight.

The Agricultural Parcels Post is designed to bring the producer into direct communication with the consumer, and is available for the transmission of :—

Biscuits	Dried Meats	Plants
Bread	Eggs	Poultry
Butter	Flour	Seeds
Confectionery	Flowers	Sugar
Cigarettes	Honey	Tobacco
Dried & Bottled Fruits	Jam	Wool Samples

and other articles produced within Southern Rhodesia. It does not extend beyond the borders of Southern Rhodesia.

The senders of articles at the reduced tariff applicable to the Agricultural Parcels Post will be required to sign a declaration that the contents are the *bona fide* produce of Southern Rhodesia.

The limits of size and weight, and the general regulations, are those applicable to the Inland Parcels Post.

This scheme must be regarded as purely experimental, and the Government reserves the right to modify these special rates of postage should too great a financial loss result.

G. H. EYRE,
Postmaster General.

General Post Office, Salisbury,
20th July, 1909.

Postal Notice No. 32 of 1912.

RURAL TELEPHONES.

IT is hereby notified for public information that the Government proposes to materially extend telephonic communication in rural districts throughout Southern Rhodesia so soon as the necessary material can be obtained, and is prepared to consider applications from groups of farmers and others who desire such communication.

Under the proposed scheme telephone lines will be erected from the nearest convenient telephone exchange or telegraph office to a centrally situated farm or place of business, and provided the parties interested undertake to attend to the telephone and transmit telegrams for the public at the tariff in force no rental will be charged for such lines. Suitable accommodation for securing the secrecy of telegrams and telephone conversations must be provided free of charge to the satisfaction of the Postmaster

General. The person selected to take charge of a central telephone office for the use of the public, will be required to pay over to the Postmaster General's Department monthly the revenue collected for telegrams and telephonic conversations and to render such simple accounts as may be required in connection therewith.

Branch lines from the selected centres to individual farms, business premises, etc., will be charged at the rental tariff in force, £6 6s. per mile per annum for farms and private residences, and £10 10s. per mile per annum for business premises. These charges are regarded to be as low as is at present feasible. Applications should be made through the Postmaster General.

G. H. EYRE,
Postmaster General.

General Post Office,
Salisbury, 16th July, 1912.

RATES FOR RHODESIA GROWN TOBACCO (UNMANUFACTURED).

THE Beira and Mashonaland and Rhodesia Railways announce that with effect from 1st November, 1912, Rhodesia grown tobacco (unmanufactured) consigned at owner's risk will be conveyed between all stations, Beira to Broken Hill and Vryburg, including branches, at third class rate, subject to a maximum charge of £2 1s. 8d. per ton, or 4d. per lb., minimum charge as for 50 lbs.; no lower charge than 1s. per consignment. Tariff Book No. 5, clause 63, page 83, is modified accordingly.

RATES FOR AGRICULTURAL PRODUCE.

The Beira & Mashonaland & Rhodesia Railways announce that, with effect from 1st January, 1913, agricultural products enumerated under clause 62 of Tariff Book No. 5 will be subject to a minimum rate of 2s. 6d. per ton,

THE BEIRA & MASHONALAND & RHODESIA RAILWAYS.

Rates for Cattle and Sheep Dip

A REVISED scale of rates for sheep and cattle dip and dip powder conveyed at owners' risk, to and from all stations between Beira, Broken Hill and Vryburg, inclusive of branches, with effect from 1st October, 1912, is given below.

The scale is applied separately over the Blinkwater, Lomagundi and Mazoe Branches in bookings to or from these lines.

Minimum charge as for 50 lbs., no less charge than 1s. per consignment. Rates in pence per 100 lbs., exclusive of cartage at cartage stations.

Miles.	Per 100 lbs.	Miles.	Per 100 lbs.
1—30	3d.	338—350	29d.
31—40	4d.	351—362	30d.
41—50	5d.	363—375	31d.
51—60	6d.	376—387	32d.
61—70	7d.	388—400	33d.
71—80	8d.	401—415	34d.
81—90	9d.	416—430	35d.
91—100	10d.	431—445	36d.
101—112	11d.	446—460	37d.
113—125	12d.	461—473	38d.
126—137	13d.	474—488	39d.
138—150	14d.	489—500	40d.
151—162	15d.	501—515	41d.
163—175	16d.	516—530	42d.
176—187	17d.	531—545	43d.
188—200	18d.	546—560	44d.
201—217	19d.	561—573	45d.
218—234	20d.	574—588	46d.
235—250	21d.	589—600	47d.
251—262	22d.	601—615	48d.
263—275	23d.	616—630	49d.
276—287	24d.	631—645	50d.
288—300	25d.	646—660	51d.
301—312	26d.	661—675	52d.
313—325	27d.	676—700	53d.
326—337	28d.	701 and over, per mile, 1d. per ton	

ADVERTISEMENTS.

FOR SALE.

Pure-bred Berkshire Pigs.—Weaners, £2 2s. each f.o.r. Banket. Bacon.—Cross Yorks-Berks and Tamworth-Berks, 8 weeks old sows, £1 1s. Hogs, 4½d. lb. Pigs of all ages always on hand.—J. F. Villar, Banket.

Government Stock Farm, Gwebi.

A limited number of Pure-bred Merino Rams, locally bred, are offered for sale, price £4 each. Apply to the Director of Agriculture, Salisbury.

White Leghorn Cockerels.

The advertiser has a number of the above for sale. Well-grown birds, from stock directly imported from Scotland last year; warranted unrelated to any in Rhodesia.

Particulars on application to:

Mrs. T. W. WILLIAMSON,

Manengas, P.O., Sinoia.

SEED MEALIES.

EUREKA, HICKORIES and other kinds. For price and particulars apply to:

S. STERN & Co.,

Box 2, Wolmaranstad, Transvaal.

Mr. H. W. TAYLOR'S Herd of Pedigree Herefords



Showle Court,
Ledbury, Hereford

Established over 60 years
Hundreds of Prizes won

Young Bulls and Heifers

Always on hand for Export

QUARTO, "27143," 5 First Prizes



Sinoia Caves. Boating on the Subterranean Lake.



THE RHODESIA Agricultural Journal.

*Edited by the Director of Agriculture,
assisted by the Staff of the Agricultural Department.*

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Editorial.

Correspondence on subjects affecting the farming industry of Southern Rhodesia is invited. Enquiries will be replied to direct, or through the medium of the JOURNAL. An interchange of ideas and suggestions between farmers will be particularly welcomed. Contributions of a suitable nature for insertion in this JOURNAL will be much appreciated. All communications regarding these matters, and advertisements, should be addressed to the Editor, Department of Agriculture, Salisbury.

RINDERPEST.—Some very natural public alarm has been aroused by the outbreak of rinderpest which has occurred in German East Africa. The subject is engaging the close attention of our Veterinary Department, who have sent the Assistant Chief Veterinary Surgeon (Mr. Edmonds, from Bulawayo) to the scene of the outbreak to enquire into the progress and force of the epidemic, as well as to secure information and advice with regard to the methods being adopted there. The Administrations of the Union of South Africa, Portuguese East Africa, Northern Rhodesia, Nyasaland and Southern Rhodesia are arranging to act in concert in the matter, and steps are being taken to procure an adequate supply of serum in case it may be required.

VISIT TO AUSTRALIA BY THE DIRECTOR OF AGRICULTURE.—Dr. Nobbs returned on 21st January from Australia, where he has been enquiring into matters relating to the advancement of the farming industry, particularly into the prospects of obtaining breeding stock there, the opening for the sale of our tobacco in Australia, the methods of the several Departments of Agriculture in the various States, and the question of agricultural education. Butter factories and bacon factories and other industrial concerns connected with agriculture received attention. The impressions received, and especially the application of information gleaned to Rhodesian requirements, will be made public at an early date.

IMPORTATION OF CATTLE FROM GREAT BRITAIN.—The prohibition against the importation of cattle from Great Britain having been withdrawn, permits for the importation of British cattle into Rhodesia will now be granted. The conditions under which importation is allowed stipulate that permits will only be issued for the introduction of stock into the Union through the ports of Capetown and Durban, and that they will be issued subject to the following conditions:—(a) The stock shall be accompanied by a certificate signed by a qualified Veterinary Surgeon, countersigned by a responsible officer of the Board of Agriculture and Fisheries, to the effect that he has examined such stock at the place of origin and found them free from any symptoms of contagious or infectious disease, and that no cases of foot and mouth disease have occurred within 15 miles thereof within two months prior to the date of shipment. (b) No fodder or bedding shall accompany stock unless derived from a similar disease-free area. (c) The stock on arrival at the port shall be subjected to an inspection by a Government Veterinary Surgeon, and, if passed as healthy by that officer, shall be landed and removed to quarantine sheds and therein quarantined for a period of 15 days. (d) All expenses of feeding, inspection, testing, destruction and otherwise of the stock shall be borne by the importer or his agent. In the event of a contravention of, or failure to comply with, any of these conditions, the permit, if it has already been issued, is liable to be cancelled. All Rhodesian importations will be subject to the above regulations, in addition to those now in force in the Territory.

A GREAT SALE OF CATTLE.—An exceptional opportunity of securing Victoria cattle will occur at Gwelo during the first week in March, when some two thousand head of cows, heifers, trek and slaughter oxen, accumulated in connection with the recent work of the Government in supplying food to the natives, will be offered for sale. For the main part the cattle are of the usual native Victoria type, with an occasional dash of Friesland or Afrikaner blood. To facilitate selection where such large numbers are concerned, the stock will be classified into lots of similar grade and quality, and sold in small lots of even grade. A great variety of types must of necessity, considering the circumstances in which they have been collected together, be present, and they, therefore, will be suitable for different purposes, but mainly as useful foundation stock. Prospective purchasers are recommended to provide themselves previously with provisional permits for moving any cattle they may buy from their respective stations to their homes in the usual way. Permits to remove the stock will be issued on the ground at the time of the sale.

RHODESIAN AGRICULTURAL UNION CONGRESS.—The Annual Congress of the Rhodesian Agricultural Union will be held in Salisbury on the 24th of February, and although we have not yet received a copy of the agenda, there are, we are aware, many matters of vital importance to the farming industry set down for discussion. The Rhodesian Agricultural Union is of fairly recent origin, but it is of vigorous growth, and its deliberations have been of great assistance both to the Administration and to the farming community.

We hope the Congress will be well attended, and cordially trust the meeting will be productive of the good results which have characterised former gatherings.

TOBACCO SALE.—The sale by auction of the 1912 tobacco crop will take place on the 17th February, and subsequent days if necessary, at Salisbury. The crop constitutes a record, the amount of leaf to be sold approximating 1,000,000 lbs., all of which, with the exception of a very small quantity of Turkish tobacco, is of the Virginia type. It is expected that all the manufacturers in the Union, including the United Tobacco

Company, will be represented, and that the great bulk of the leaf will be disposed of. With such an increased crop there is, of course, a fair amount of scrap, but the percentage of good bright leaf is quite up to the average. Rhodesian tobacco is now largely smoked in the south, and, providing the quality is maintained, there is reason to hope that it will in the not very distant future still further oust the imported product. A tobacco takes a considerable time to establish itself, and manufacturers are chary of making radical changes in the blending of their tobaccos, unless large quantities of uniform quality can be relied upon, a condition of affairs now being attained in Rhodesia.

Our tobacco is gradually gaining ground, and at the present time a certain quantity is used in most of the cigarettes manufactured in the south. We regret that Mr. Rice, who has supervised the auction sales since their inauguration, will unfortunately not be present at the forthcoming sale, he being somewhat seriously indisposed at the Cape.

TOBACCO WAREHOUSE.—The Commercial Representative of the British South Africa Company announces that the management of the Tobacco Warehouse has reverted to the control of the Commercial Branch, and will be conducted in future along the following lines:—1. The warehouse will be open to receive Virginia leaf from all planters. 2. Every planter (including the Tobacco Company of Rhodesia and South Africa, Ltd.) will be treated alike in every respect. 3. Leaf will be sold by auction as hitherto. 4. Planters will be granted the same right of withdrawing their leaf from sale by auction as in previous years, upon payment of cost of preparation for sale. 5. The system of advances will be continued. 6. After deducting cost of management, amortisation and reasonable interest, the whole of the balance of profit will be distributed *pro rata* among those growers who leave their leaf to be sold by auction.

The Commercial Representative will retire from the Board of the Tobacco Company, and the transfer of the Warehouse will take place after the forthcoming sale, when the company will at once take steps to provide such additional accommodation as the expansion of the industry demands.

CITRUS FRUIT GROWING IN RHODESIA.—The article appearing in this issue, written by Mr. C. E. Farmer, adviser on citrus cultivation to the British South Africa Company, containing his first impressions of Southern Rhodesia as a citrus fruit growing country, will, we think, be read with lively satisfaction. Mr. Farmer, who has grown citrus fruits for 18 years in America, tells us he has seen orange trees in this country, five years after planting, and grown without the application of manure of any kind, that could not be equalled for size and bearing capacity in Florida in seven years, where two applications a year of commercial fertilisers are given. Mr. Farmer further says that, while in the Marandellas district, he was much struck with the clean, fine texture and appearance of the lemons grown upon the granite soil. They were of good commercial size, and equal to any he saw during a recent visit to Sicily. Again, the ideal climatic conditions for the growth and ripening of citrus fruits prevail in Rhodesia. These are significant statements, which must be regarded as very encouraging.

The citrus fruit industry in Southern California is to-day valued at probably over 20 millions of dollars a year, while the price of undeveloped fruit lands without water rights has risen to as high a figure as 200 dollars to 250 dollars per acre. Here, if we read Mr. Farmer aright, the conditions for growing citrus fruits are equally as favourable as in America, while the advantages we possess as regards cheap land, cheap labour and a ready market are unique. Surely we are not going to let these opportunities pass!

It is with pleasure we are able to announce that the services of Mr. C. E. Farmer are available, in so far as his duties permit, to the farming community of this Territory, free of charge. Applications should be addressed to the Director of Land Settlement, Salisbury.

IMPORTATION OF POULTRY.—As will be seen from Government Notice No. 375 of 28th November, 1912, published in this issue, all poultry imported by rail is now inspected by an Inspector or Sub-Inspector at Plumtree, Bulawayo or Umtali, in order to see that they are free from disease. Any consignment of poultry shewing symptoms of disease may be detained, or,

if it is likely to convey infection, the birds may be destroyed. The introduction of these regulations is due to the fact that although destructive fowl diseases do exist in this Territory, several cases have occurred where infection has been introduced from the south and from Portuguese Territory, resulting in enormous loss to owners of poultry.

SERVICES OF TECHNICAL OFFICERS.—Once again we would request farmers, when applying for the services of the technical officers attached to the Department of Agriculture, to give full particulars as to the situation of their farm and the distance from some well-known centre. The absence of these essential particulars frequently occasions difficulty and considerable loss of time to visiting officers.

MOLASSES FOR FEEDING STOCK.—Molasses are an excellent stock feed, especially for stud animals or milch cows, and correspondence has passed between the Department of Agriculture and the Railway administration with a view to obtaining a reduction of the existing rate on this commodity from Beira or Durban. In his reply, the General Manager of the Railways points out that molasses in *full truck loads* for cattle feeding are carried from Durban to Salisbury at a rate of £9 12s. 9d. per ton, which, for a distance of 1,464 miles, is considered a low rate. By ordering a truck load, the cost of molasses in Salisbury would work out at about 1s. 6d. per gallon, against 2s. 6d. per gallon if ordered in lesser quantities, and we would therefore suggest to farmers desirous of obtaining this nutritious feed, to combine their orders so as to make up a truck load, thus securing the advantage of the reduction.

CEMENT FOR IRRIGATION PURPOSES.—Farmers and others concerned will be pleased to learn that the Railway administration has now agreed, with effect from 1st January, 1913, to convey cement for use in connection with irrigation works for agricultural purposes at the specially reduced rate applicable to cement used in the construction of dipping tanks, viz., half third-class inwards rate. The progressive farmer in this coun-

try is more and more turning his attention to the irrigation of his lands, and the concession now granted will, we may hope, encourage many farmers to undertake irrigation schemes which, owing to the high railage charges on cement, they were unable previously to entertain.

Further evidence of the desire of the Railway administration to assist the farming community will be noted in the decision to reduce the rates on salt (coarse and rock) for stock feeding, as announced in a notice appearing at the end of the *Journal*. This is a concession which we are sure will be much appreciated.

RATE FOR GUANO AND FERTILISERS.—Attention is drawn to the notice appearing at the other end of the *Journal* announcing that, with effect from 1st March, 1913, certain reductions will be made in the scale of rates over the Rhodesia railways for the carriage of guano and fertilisers. We feel sure that the concessions will have a far-reaching effect upon the agricultural industry of this country and trust that the specious argument so often used when reductions in railway rates are asked for, that the quantity carried will increase, will in this case be soon realised, although it is to be noted that the reduction comes into operation just too late for this planting season.

Milking Competitions.

THE BRITISH TEST SCALE FOR BUTTER FAT.

At the Royal Counties Show in England, the following method was used for determining the milk and butter-fat tests of Jersey cows. It strikes us that this is a very fair and just method :—

One point for every ten days since calving, deducting the first 40 days (maximum points for every 1 per cent. of fat shewn on an average of two milkings).

For short tests at fairs, this arrangement appears to be quite comprehensive and just—(“Rhodesia Advertiser.”)

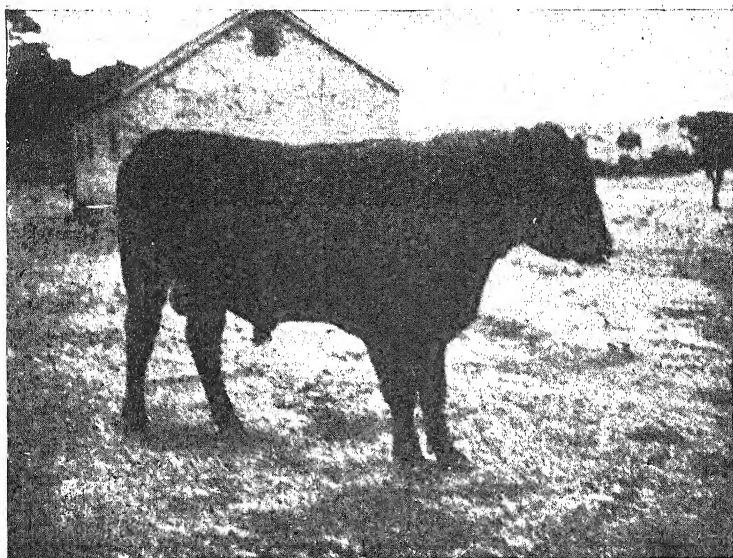
Lendy Estate.

THE PROPERTY OF MR. A. W. PARTRIDGE.

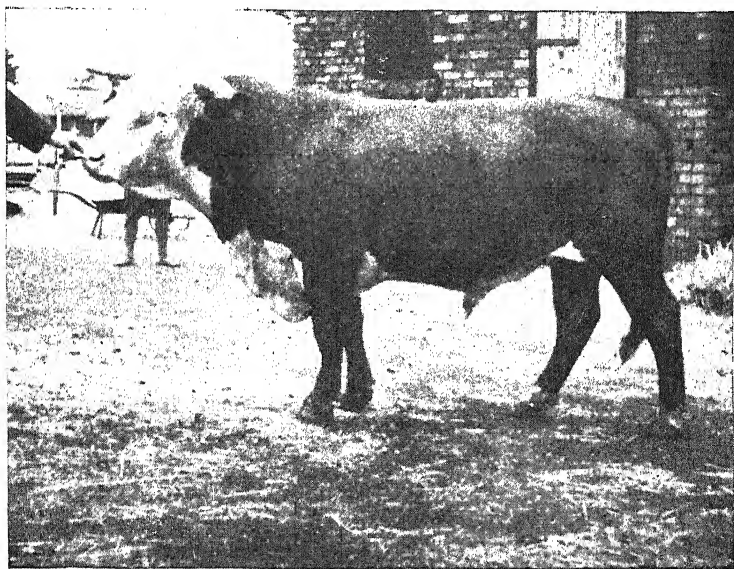
Notes by R. C. SIMMONS.

The Lendy Estate is situated in the Marandellas district on the south side of and adjoining the Beira and Mashonaland Railway, near Marandellas Station. It consists of a number of farms, comprising altogether about 50,000 acres, and is worked as one holding for the purpose of cattle ranching. The Estate is made up of a number of wide open valleys, divided from one another by low ranges of hills, on which a fair amount of timber is found. There is not much timber in the valleys, but enough for shelter is found on the slopes. The soil is principally granite, with an intrusion of diorite running through the centre of the Estate. The greater part of the veld is sweet. The water supply consists of several good streams, which were still running well in November of this year of drought, 1912.

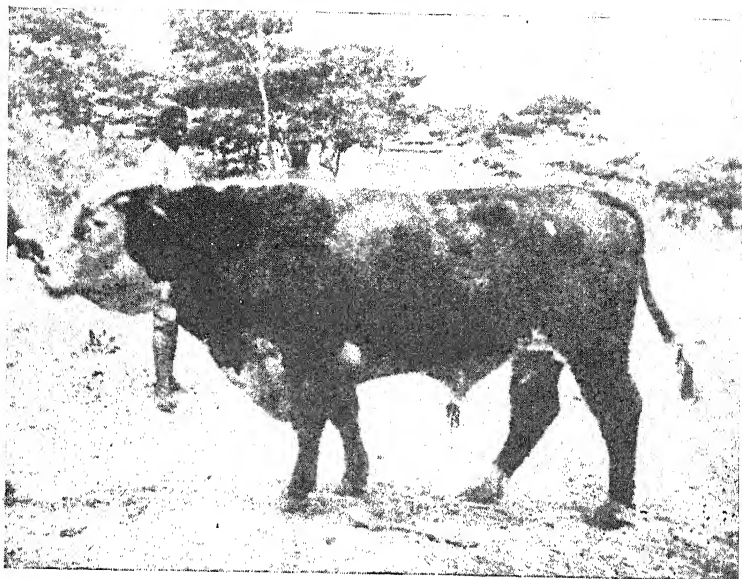
Mr. Partridge began to establish his property and to collect a herd of cattle there about the year 1904. The foundation stock were bought and collected by Mr. Fred Cooksy, a nephew of the owner, who has since managed the property. Most of the original animals came from the Victoria district of Southern Rhodesia, from North-Eastern Rhodesia, and from German East Africa. Cattle were obtained, however, from wherever possible, and a number of Colonial heifers were included. Taken as a whole, the cattle were good, and many were particularly fine cows of their kind. At first bulls of various kinds were used, native bulls, Africanders, half-bred Shorthorn and half-bred Friesland; in fact, anything that could be procured, and which was individually passable. At this time, owing to fears of African Coast Fever and other diseases, not only was it impossible to use pure-bred bulls with any degree of safety, but the great object was to get strong healthy heifer calves that would live and thrive on the veld. Their shape and early maturing qualities were not then a matter of importance,



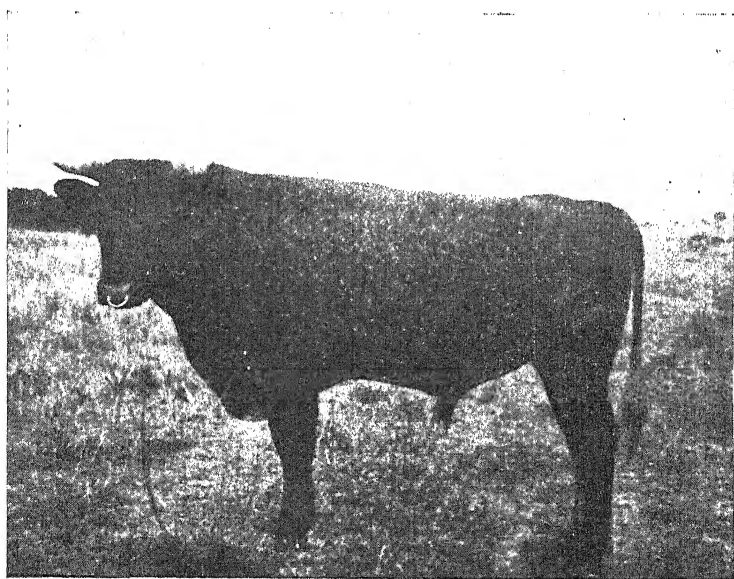
Aberdeen Angus Bull, "Prince Fabian." Lendy Estate.



Hereford Bull, "Gipsy Boy," 2 years 9 months old. Lendy Estate.



Hereford Bull, "Scribe," 21 months old. Lendy Estate.



Shorthorn Bull, "Spice Box," 2½ years old, Lendy Estate.

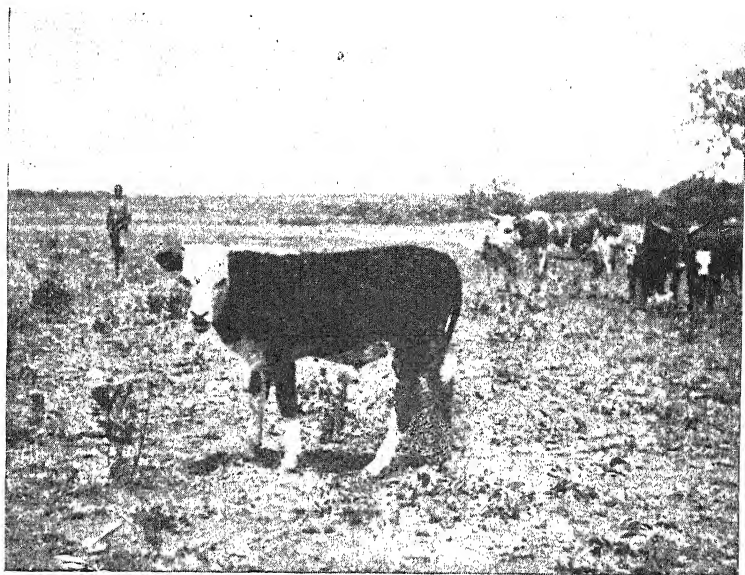


Shorthorn Bull, "Cartly Roseden," 19 months old. Recently recovered from an attack of Redwater. Lendy Estate.



Half-bred Aberdeen Angus Bull Calf, 2 months old, shewing type of Dam, Lendy Estate.





Half-bred Hereford Bull Calf, 12 weeks old, out of a Victoria Cow.
Lendy Estate.



Half-bred Hereford Calf (2 months old) and Dam on Lendy Estate.

About the year 1908, Mr. Partridge began to consider the advisability of improving his stock, by the use of pure-bred bulls. He had noticed the thriftiness of native polled cows and their similarity to the Aberdeen Angus, and with the object of perpetuating their special qualities, he imported a very good Aberdeen Angus bull, and put him with a number of selected native polled cows. This bull, "Rock II. of Western Leochel," was bred by Mr. Peter Dunn, of Western Leochel, Whitehouse, N.B., and was bought from Mr. Charles Robertson, Sunhoney, Echt. Though a really fine animal, he eventually proved a pure stock-getter. He was at first carefully stabled. When Mr. Cooksy took over the resident manager-ship of the Estate, he thought that stabling had made the bull too heavy and fat, and he therefore turned him out with the cows. This treatment improved him somewhat. He became more active, but he eventually died, having left only a limited number of calves behind him. The next purchase was another polled Angus bull from Messrs. Dimmock & Zimmermann, of the Rhodesia Ranching Company. This bull, "Pasha of Elchies," bought originally from Mr. J. Hastilor of Grantown, N.B., lived about twelve months, and then died of veld poisoning. He was responsible, however, for a number of the progeny now running on Lendy. Finally, about 1911, a very nice bull, "Prince Fabian," bred by Mr. D. S. Grant, Cromdale, Forfarshire, N.B., was bought from the late Mr. Campbell, of the Lomagundi district, and is now at service with the herd. This bull, now about two-and-a-half years old, appears to have never recovered from the process of inoculation, and, although a beautifully-shaped animal, has never fully grown out. It is hoped that his progeny will not suffer on this account.

Although, as indicated by the foregoing, Mr. Partridge has persevered with the Aberdeen Angus, he is not, up to date, entirely satisfied with the half-bred progeny, and is of the opinion that they are inclined to legginess as they approach maturity. About 15 months ago (early part of 1911) two Hereford bulls were purchased: one, "Stratton Comrade," bred by Mr. R. Edwards, of Stratton-on-Avon, and another, "Gipsy Boy," bred by Mr. N. R. Evans, Court of Noke, Herefordshire. Both these bulls have proved good stock-getters, and already over 100 calves have dropped to them.

Unfortunately, "Stratton Comrade" died. "Gipsy Boy," now two years and nine months old, is still alive and active, and is a very excellent bull indeed. Another younger Hereford bull has lately been imported, namely, "Scribe," now twenty-one months old, bred by Mr. J. R. Hill, Orleton Manor, Herefordshire. He is a good bull, and is doing well.

Besides the Herefords, two Shorthorn bulls and a Sussex bull have been purchased by way of experiment. One of the Shorthorn bulls, "Spice Box," bred by Mr. Robert Bruce, of Heatherwick, Inverurie, N.B., has been on the Estate about twelve months, and a few calves of his are dropping this season. He has been inoculated, is now in beautiful condition, and is a particularly active type of bull, notwithstanding the fact that he is saturated with Scotch blood. The other Shorthorn bull is "Cartly Roseden," bred by Mr. A. Mennie, Cartly, N.B. He is now nineteen months old. He has only been on the Estate about three months. He was not artificially inoculated, and is now just recovering from an attack of redwater. This bull bids fair to grow into one of the biggest in Rhodesia; he is a splendid framed, deep, short-headed bull of very pronounced Scotch type. In the opinion of the writer he is rather too finished a product for this country, but time will shew whether this is the case or not. The Sussex bull, "Graveny Orion," has also only lately arrived. He was bred by Messrs. L. & G. Finn, of Westwood Park, Sussex, is about nineteen months old, and, in spite of the fact that most of his photos make him look weedy and wanting in the hindquarters, he is growing out into a very nice bull.

With something over 3,000 head of cattle on the Estate, it is still necessary to supplement these pure-bred bulls by a good many others of mixed breeding, the bulk of which are big strong bulls of grade Shorthorn-native or Africander blood. As was to be expected, a very marked improvement on the native type is seen in the half-bred calves. All the young calves, whether Hereford, Shorthorn, or Polled Angus, are good, and are doing well, in spite of the fact that at the time of writing practically no rain has fallen, and feed is very scarce. The Polled Angus yearlings, as before mentioned, have somewhat failed to fulfil their promise as calves, but it is noticeable that those bred by better cows are very satisfactory, and the steer

calves are nearly all good. The Hereford calves are most encouraging. They are, almost without exception, short, thick and stocky, and this to a greater degree than the few Shorthorn calves that have been dropped.

The time is not yet ripe to form a definite opinion as to the respective merits of the various improving breeds used. In the first place, the Hereford bulls were probably in better condition at the time of service than the Shorthorn, which may account for the Shorthorn calves being slightly inferior. Again, with regard to the Polled Angus, until a thorough test can be made of their value, it will be obviously unfair to the breed to condemn them. It is pleasing to note that all Mr. Partridge's imported bulls (with the exception perhaps of one or two late arrivals not yet fully acclimatised) are in the pink of active vigorous condition, and if the progeny prove too delicate, it will be the fault of the breed, and cannot be attributed to want of care of the bulls.

A few words on the system of management of bulls employed on the Lendy Estate will be of interest.

A part of the Estate is valuable arable land, with a considerable acreage under irrigation. Lucerne, oat forage and similar foodstuffs are grown, and a liberal supply given to the bulls, together with bran, mealie meal, oilcake, etc.

The present horse stables were originally built for the bulls. They come into the stable in the morning when the horses are turned out, and are fed there for a couple of hours, after which they are turned out to the water-trough, and lie about, or graze a little, as they feel inclined, until afternoon, when they are stabled again and fed for a couple of hours before being sent to the kraals containing the cows. The bulls do not wander far from the stables until night, when they go to the cow kraals themselves.

No doubt, when more fencing has been erected and camps made, some modification of this system will be adopted, but it is remarkable how easily the plan works, and how peaceably three or four bulls graze together in a small herd during the day. The cows are kraaled at night now, on account of the shortage of feed, which would otherwise cause them to wander

too far. At normal times the cows are not kraaled, but in future they will probably be run in large camps at night with the bulls until they are in calf.

Naturally, such a system of bull-management as is practised at Lendy entails a considerable expenditure of money, but so far the results go to prove the correctness of the writer's contention, that money so spent is well spent, and that the return will be greater than if it is sought to economise in any way under this heading.

So far, sheep have not been very successful at Lendy, but very little of the manager's time has been available for this branch of stock raising. The few remaining half-bred sheep are to be disposed of shortly.

A small stud of horses has been established, consisting of the thoroughbred stallion "Spring," by "St. Patrick" out of "Tambourine"—a well-known horse in Rhodesian and other South African racing circles. The mares running with him are: "Royal Gem," by "Imperial II." out of "Tactantia"; "Fairy," by "Minor Forfeit," whose dam was by "Indian Brave"; "Pink Domino," by "Sir Geoffrey" out of "Masquerade," and two very nice half-bred mares (mother and daughter, both Rhodesian bred). The mare "Fairy" is well-known to Rhodesian racegoers, and was lately the property of Major Drury. She is a grand type of mare from which to breed saddle horses. "Royal Gem" is South African bred, and is a big, bony mare, shewing considerable breeding. "Pink Domino" was bred in England, and is full of quality but small. The two half-bred mares have foals at foot by "Spring," two yearlings and a two-year-old colt by a half-bred horse out of the older mare. All five mares are now in foal to "Spring." These horses are well-fed and stabled at night, and, so far, only one or two deaths have occurred from horse sickness.

A small troupe of donkey mares have been running with a Zanzibar jack donkey, to which they are now foaling. It is intended to remove the "jack," and to run the mares with a well-built locally-bred pony stallion, with a view to breeding jennets.

Tobacco Culture.

SEASONABLE HINTS.

HARVESTING AND CURING.

The notes appearing in the last number of the *Journal* covered the operations of the grower up to the ripening period. With the splendid start most of the tobacco had this season, owing to the early December rains, it is probable that a considerable quantity of the present crop will be harvested and curing commenced in March, and some notes in this issue, dealing with these two operations—more particularly with the curing process—may be of timely service.

HARVESTING.—When the proper stage of ripeness has been reached, the time has arrived for the harvest. All portions of the tobacco plant do not ripen at the same time, and, because of this fact, two different methods of harvesting have been developed. In the one system the whole plant is harvested on the stalk when the middle leaves of the plant are mature, while in the other system each leaf is primed off as it becomes ripe. The first system is accomplished with the minimum of labour, although it will not produce so large a percentage of properly ripened tobacco as the second system, for when the middle leaves are at the proper stage of ripeness, the lower leaves are over-ripe, and the top leaves still green. The advocates of the stalk cutting or whole plant system maintain that a large percentage of the material in the stalk is transferred from the stalk to the leaf during the process of curing, and this claim seems to be substantiated by experience. This system is the one largely used for the bulk of the tobacco in America, but that grown in Rhodesia, bright tobacco, is usually harvested by the single leaf method. In some places a combination of the two methods is adopted, the lower leaves being harvested singly as they ripen and the upper half of the plant taken off with the stalk. Where the leaves are primed they are at once placed in baskets and hauled to the curing barn.

There appears to be no better way of stringing leaves than that at present in use in Rhodesia. This can best be explained by practical demonstration, but the general principle is that one length of string is used and the hands of leaves looped on alternate sides of the stick. The stick is then hung on the tier poles in the curing barn. The hanging of the leaf does not appear to receive the attention it deserves. Many growers hang the leaf too thickly, and also string it at uneven distances on the stick. In the former case the leaf does not have a fair chance of drying, while if the bunches are hung unevenly the current of air is unequally distributed. The "hands" should not consist of more than three leaves, and the sticks should be far enough above each other so that when the tobacco is hung there will be sufficient ventilation space between the tips of the stalks or leaves of the top tier and the leaves of the tier below, so that each "hand" will get the same amount of ventilation.

Bright sunny days should be chosen for the time of cutting. The acidity of the leaves is less on a warm sunny day than upon a cool or cloudy day, and is also less in the evening than in the morning. On a bright day the processes of metabolism are promoted, and the respiration stimulated, so that at the end of such a day the leaf will have more of the desirable products and less of the undesirable by-products than at other times.

The plant should be slightly wilted before being hauled to the curing barn, as this will prevent breakage and hasten the commencement of the curing process.

Leaves, if left long exposed to the sun, will become sunburned, that is, the heat of the sun will kill the plant cells and at the same time destroy the enzymes that bring about fermentation; this being the case, no further life changes or processes of fermentation can take place, and, with the exception of the drying of the leaf by the evaporation of moisture, no improvement will take place. The greenness of a sunburned leaf will always remain and reduce its value. Sunburned leaves will carbonise and not burn satisfactorily.

FLUE CURING.—This is a process where artificial heat is used for curing tobacco, but open fires are not permitted, and the smoke does not come in contact with the tobacco. The fires, which are of wood, are in small brick furnaces, in some

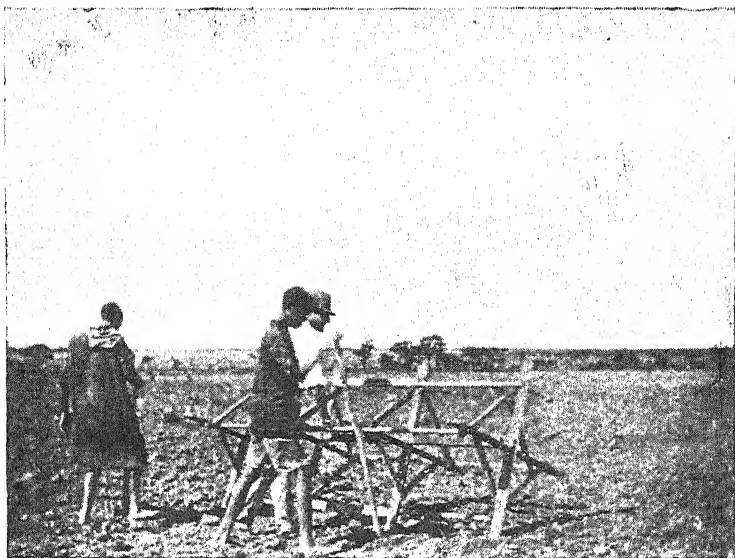
cases on the outside of the building, and in others inside, and the heat is carried through the building and under the tobacco by means of large sheet-iron pipes or flues. This is the system used for the curing of the yellow tobacco of the Virginia type, which has become so popular for pipe smoking, cigarettes and for the plug wrappers of chewing tobacco. The feature sought in the yellow tobacco is the colour, and the aim is to produce this and yet damage the texture and elasticity of the leaves as little as possible. In the dry climate of South Africa it has become evident that heat also has a value in the curing of dark tobacco, if for no other reason than to remove the greenness so common in much of the air-cured leaf.

No other type of tobacco or other system of curing requires as much skill in its handling. A little misjudgment in maintaining a certain temperature for too long or too short a time will largely lessen the value of the product. Slight shades in colour may mean large differences in the selling price. No set rules can be given for the handling of this process, as much depends on the condition of the leaf when placed in the barn, and on the weather conditions during the curing period. Plans of flue-curing barns appeared in the December number, but it may be said here that the barn must not be so large that it cannot be filled in one day, for the tobacco in any one barn should not be in different stages of greenness. The standard flue-curing barn, illustrated in Bulletin No. 134, issued by the Department of Agriculture, holds from 700 lbs. to 800 lbs. of leaf, and may be estimated to be capable of curing about 8 acres of tobacco in one season. The barn must also be in a locality protected from the winds, for a strong wind will cause the temperature to be much lower on the windward side of the barn than elsewhere, and thus prevent an even curing of the contents. The ventilation of the barn must also be under perfect control. It is perhaps needless to say that, where so much heat is used, a thermometer is a necessity. This should be hung in the centre of the barn, and in such a position that it may be easily read from the door.

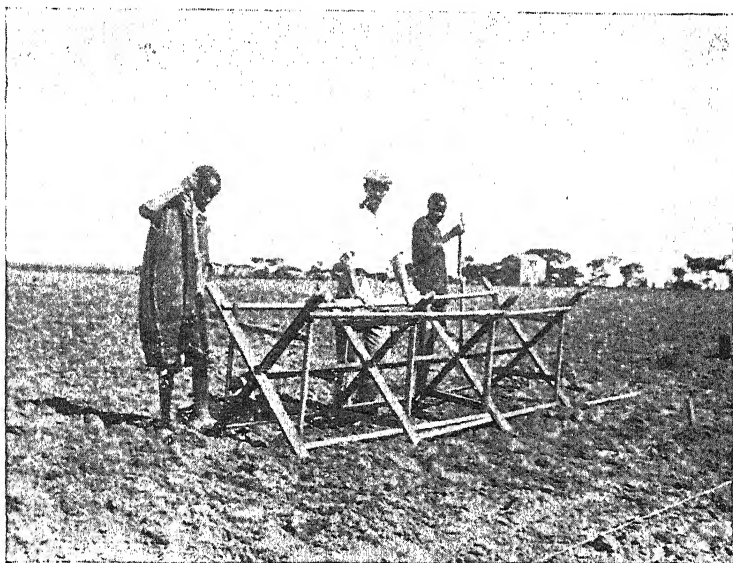
Fires should be started immediately the barn is filled, for fermentation commences as soon as the tobacco is reaped, and the more quickly it is cured the better. As soon as the barn is full, start a slow fire in the furnace, and slowly bring the barn up to the temperature required.

Where the leaf is ripe and sappy, and has been grown on a sandy soil, yellowing is not difficult, but where the leaf has made a slow growth and is leathery, it often refuses to colour. In the latter case, increase the humidity of the room by letting in steam, or by sprinkling water on the flues, until the air feels moist. The yellowing stage will require from twelve to thirty-six hours, according to the character of the leaf. Where more than the latter period is required, it is almost impossible to secure really bright tobacco, and the attempt may be abandoned. If the building is required, the obstinate leaf may be shifted into another building and left to air-cure; but if it is left in the flue-barn, a slow fire should be kept up for several days, and the temperature of the room maintained from 80 to 100 degrees. So long as the temperature does not run over a hundred, the fire will not require much attention. These remarks, it must be understood, apply to tobacco that will not yellow and does not apply to bright leaf.

The second stage of flue-curing is that of fixing the colour. As soon as the leaf has turned to a greenish yellow colour, commence to gradually increase the temperature. If the leaf is permitted to become a bright yellow before the temperature increases, there is danger of it becoming dark and badly sponged before the colour is fixed. The fixing of the colour is the difficult stage of flue-curing, for if the temperature be too low, and the room humid, the leaf will "sponge." By sponging is meant that the leaf develops nasty porous brown patches. Sponging is checked or prevented by opening the ventilators; but the heat must be maintained. If the novice increases the heat in an attempt to carry off this moisture, the tobacco sweats still more until a point is reached where the surface of the leaf is cooked and it begins to "blotch." The term blotching is used to describe the smooth, hard reddish-brown spots that appear on the leaf as the result of high temperatures. When the leaf blotches, the beginner is frightened, and rapidly reduces his temperature, with the result that the warm leaf still sweats, and sponging becomes general throughout the barn. The correct practice is to keep the leaf sweating, but to so regulate the temperature and ventilation that the moisture is carried off the leaf as rapidly as it appears, and at the same time to limit the ventilation sufficiently to prevent the surface cells of the leaf from being dried out faster than they can draw



Tobacco Marker at work.



An ingenious Tobacco Marker constructed and used by Mr. S. L. Nalty at Chudleigh Farm, Marandellas. With this contrivance the guide line has only to be shifted every four lines, instead of every line as with the linked wire. Mr. Nalty claims that a considerable saving of time is effected by using this marker.

moisture from the interior of the leaf. If these surface cells become dry at this stage, the moisture cannot escape rapidly through them, but remains in the leaf, and at the slightly higher temperatures to follow results in blotching. The leaf must sweat, but cannot do so in a very dry air, but if at the same time the air is over humid, oxidisation is rapid, and the leaf sponges. To state in another way, sponging is the result of moisture on the surface of the warm leaf; blotching is caused by the failure of the moisture to escape and the cooking of that portion of the leaf by high temperatures, and is often induced by the drying out of the epidermis of the leaf at any of the previous temperatures. As already stated, sponging is prevented by ventilation and by the slow increase of temperatures; blotching is prevented by the same means, but, in sponging, the greater the ventilation the less the danger; in blotching, the greater the drying due to ventilation the greater the danger. To prevent both it is necessary to strike a happy mean, which is not difficult where all the leaf in the barn is of the same degree of ripeness. Where the leaf in the barn varies regarding the degree of ripeness it will not undergo the same changes at the same time, and it is necessary to regulate the heat and ventilation according to the requirements of what appears to be the most valuable class in the barn.

To go back to the first or yellowing stage. As we have before stated, a certain amount of humidity is necessary during the yellowing stage, for if the moisture escapes rapidly from the leaf all action within the cells ceases and the chlorophyl (green colouring matter) of the leaf is not destroyed as it is when the leaf remains alive and slowly starves to death. This destruction of chlorophyl by the dying leaf is noticeable in all leaves, except those that are rapidly killed by excessively high or low temperatures, dry winds, etc. In an ordinary air-curing barn the same yellowing takes place where the weather conditions are favourable, but in a flue barn the change is much more rapid, and under the influence of heat the leaf yellows as much in a day as it would in the air barn in a week. In the air barn, however, if the weather is cold or dry only a portion of the chlorophyl disappears, and the leaf is left with a nasty green tinge. Now, it is evident that under ideal conditions any leaf would become as yellow in an air-curing barn as in a flue-curing barn, but those ideal conditions seldom exist, for if the weather

is excessively moist each portion of the leaf oxidises as rapidly as the chlorophyl disappears, and we never observe the yellowing stage.

Now, in the yellowing stage in the flue-curing barn, the novice remembers all that he has heard about excessive moisture in the barn inducing sponging, and in an effort to keep ahead of his tobacco, he starts full ventilation too soon, that is, before the leaf has yellowed, and ends up by so drying the leaf that there can be no change, and it therefore remains green. This is the same effect as produced in an air-curing barn or in sun-curing by drying winds.

To return to the fixing of the colour. After the temperature has been slowly increasing for from twelve to thirty hours, and the leaf has lost the greater portion of its moisture, it will begin to dry at the tips and around the edges. Where this drying is general throughout the barn, the second stage may be regarded as at an end. The temperature at this point should be about 120 deg. F.

The third stage simply consists of the rapid drying out of the leaf, and is commonly calling "the killing of the leaf." The temperature is increased from 120 deg. to 160 deg. F., at the rate of four or five degrees an hour, and is held at the higher temperature until the midrib is perfectly dry and brittle. During this stage the ventilators are partially open, but inasmuch as less moisture is escaping than during the sweating stage, and because of the great draught due to the heat, they are not fully open. Wide-open ventilators mean a large consumption of fuel.

As soon as the drying is finished the fires are drawn. The leaf may then be rendered pliable by running steam into the room, after which it is taken down and removed to the packing house. In the packing house it may be bulked on the curing sticks and handled at a later date. In moistening the hanging leaf only use enough steam to render the body of the leaf pliable, while the midrib remains somewhat brittle. Excessive moisture will result in mould and in the darkening of the leaf.

During the curing process, large timber will be found to give a more even fire and less changeable temperature than small sticks, and the bulk of the wood should be heavy. Small

sticks are needed to put with the large wood whenever the fire is low. When the fire is to be left for some time, and it is feared that the temperature will vary, it is safer to so arrange it that it will become less instead of greater, for the brick walls of the buildings will give up sufficient heat to compensate for a diminishing fire. A large bed of coals will maintain an even temperature for a couple of hours. Avoid rapid changes in temperature, and even where the temperature is found to have dropped below the desired point, do not attempt to force it up rapidly by means of a large fire, for the result will be excessive temperatures in a few minutes, and the ruination of the tobacco. When it is intended to open the ventilators, slightly increase the fire before doing so, and thus prevent a falling temperature. At sundown additional firing is necessary to maintain the day heat, and at sunrise the fire should be slightly reduced unless an increased temperature is desired.

The first, and perhaps the most essential, point in connection with flue-curing is to have all the tobacco in any one barn uniform in ripeness and in body, and all as ripe as possible.

The following temperatures are given as a guide to the beginner with no experience in flue-curing tobacco, and it is hoped that with a few changes, to meet varying atmospheric conditions, they will give satisfactory results. Moisture has usually to be supplied in the dry climate of Rhodesia, by the application of steam, or by laying wet sacks on the floor of the barn. This should be done when the fires are started, and should be kept up for six or eight hours, when it may be discontinued, the tobacco by this time having sufficient moisture.

RIPE THIN TOBACCO.—95 deg. for 7 hours, 100 deg. for 8 hours, 105 deg. for 12 hours, 110 deg. for 6 hours, 115 deg. for 6 hours, 120 deg. for 5 hours, 125 deg. for 4 hours, 130 deg. for 8 hours, 135 deg. for 6 hours, 140 deg. for $1\frac{1}{2}$ hours, 145 deg. for $1\frac{1}{2}$ hours, 150 deg. for $1\frac{1}{2}$ hours, 155 deg. for $1\frac{1}{2}$ hours, 160 deg. for 3 hours, 165 deg. to 180 deg. until cured.

RIPE HEAVY TOBACCO.—95 deg. for 8 hours, 100 deg. for 9 to 10 hours, 105 deg. for 14 hours, 110 deg. for 8 hours, 115 deg. for 6 hours, 120 deg. for 7 hours, 125 deg. for 5 hours, 130 deg. for 8 hours, 135 deg. for 6 hours. Then proceed as in first receipt.

UNRIPE (GREEN) TOBACCO.—Tobacco should never be put into the barn green unless it cannot be avoided. The following are the temperatures suggested with such leaf :—90 deg. for 6 hours, 95 deg. for 8 hours, 100 deg. for 14 to 16 hours, 110 deg. until the last leaf is yellow, and then proceed as in first receipt. The atmosphere being very dry, considerable moisture should be put into the barn at the start, to ensure the leaf not drying too soon.

Best Cow in British Empire.

Rosalind, a Jersey cow, and her owner, Mr. C. A. Julian-Sharman, were honoured by a dinner given at Red Deer, which was attended by a large number of the prominent agriculturists of Alberta. Rosalind of Old Basing, to give the lady her full name, has, according to "The Red Deer Advocate," just completed the highest consecutive three years' official test in yield of butter and milk of any cow in the British Empire, and, with one exception, and that of another Jersey, has proved herself the best cow in the world. The following are the remarkable figures of her performance :—Highest milk yield in one day, 52 lb. ; highest milk yield in one month, 1,471½ lb. ; highest milk yield in one year, 15,700 lb. ; total in three years, 27,847½ lb. ; average test, 5.16 per cent. Butter in one year (highest), 1,031 lb. ; butter in three years, total, 2504.33 lb. The actual return for butter and milk in three years was £200. Besides, there was the value of three heifer calves, not known, but £400 refused. The owner, Mr. Julian-Sharman, in returning thanks for the honour paid to Rosalind and himself, remarked that these extraordinarily good results were only made possible by the unremitting care of his dairyman, Mr. J. Jones, who, during the three years' test, had hardly missed a milking except when ill ; on these occasions he himself had endeavoured to take his place, with the result that Rosalind's normal milk yield had decreased about fifty per cent.

Cultivation of Sumatra Tobacco.

By C. C. MACKENZIE, Pasipas.

The cultivation of Sumatra tobacco is to all intents and purposes carried on in its initial stages in the same way as Virginia, the seed beds and planting out being identical. The plants are planted out in rows on the flat, and shaded by a small shingle or grass, until they revive, when they are ridged, very lightly at first, and allowed to remain till they are about ten inches high, when they are ridged again, the earth in each instance being well heaped up close to the stem. When the plants are from eighteen inches to two feet high, the two lower leaves are plucked off and laid round the stem, and are covered up with the last ridging—the better the plant is ridged the better it will stand storms.

In the cultivation of Sumatra tobacco, the great trouble is to keep the plant free from worms, as broken leaves mean a loss of 75 per cent. of the value of the leaf. Buyers do not want leaves with holes in them, as their idea is to get as many wrappers out of a leaf as possible, and there is no such thing as scrap on the cigar cover market. The plants have to be examined every day, and all caterpillars caught should be put into a bottle, so that the grower can see what the boy has been doing, as well as destroying the worm. Grasshoppers are another enemy of the tobacco planters, as is also the little white butterfly, which lays its eggs on the back of the leaf. The leaf must be carefully examined both sides, and after a few weeks' diligent work it will be found that the worms decrease, and, when the tobacco is topped, transfer their attentions to the young suckers, which does not matter so much. The next important item is the topping. This in general is done far higher than with Virginia leaf, the general rule being to let the flower come right out, when it is topped down to the second leaf. Low top-

ping means a heavy leaf, and this must be avoided, as a light brown leaf is what the buyers want. All plants must be carefully suckered at least twice. As regards the two big shoots that come out on top of the plant after it has been topped, there has always been a difference of opinion, many planters maintaining that it is good to let them grow, as they tend to lighten the leaf, by taking the strength out of the plant. However, after years of experimenting, no one seems to have come to any decided decision, so it can be left to the discretion of the planter to please himself. One thing must be remembered, and that is, by leaving the suckers on, the plant has a tendency to become top heavy, and so more liable to be knocked down by storms.

Now we come to harvesting. This is carried on in the same way as Virginia, by picking the leaf singly, but the difference is that the planter must divide his plant into three grades of leaf, viz., foot, middle and top. Before starting to reap, he must make up his mind as to what he is going to call each grade; this, of course, depends on the size of the plant. I should imagine that in this country the average plant would carry eighteen leaves, in which case the planter would decide to call the bottom, six foot leaf; the next, eight middle; and the balance, top; or eight foot and six middle; but whatever he decides on in the first place he must stick to all through the crop, otherwise he will have trouble with the sorting later. The ripeness of the leaf can be determined in the same way as Virginia, but the leaves must be picked off in a systematic manner, two leaves being taken off each plant right through the field. Care must be taken when picking to lay each leaf on top of the other, as otherwise the stems break. The leaves are now put into large crates or baskets and taken to the shed for stringing.

It is usual to put forty leaves on a stick six feet long, but the tobacco must not be strung, as with Turkish, all one way, but face to face and stem to stem, in order to avoid sweating when drying, as this gives the leaf a dirty colour. After the stick is finished, the leaves must be parted a little, to let plenty of air in while it is drying.

The tobacco is then hung in a grass shed, with the doors and windows closed, until it is yellow, when the light is gradually admitted. If the tobacco is allowed to dry too quickly, it is

apt to become brittle. All doors and windows are closed at night. Drying takes from twenty-three days to a month, according to the weather. The tobacco is then taken down and tied up in bundles, a stick to a bundle, with some bark string or anything handy, when it is ready to be delivered to the shed where the fermenting is going to take place. Great care must be taken to see that all the stems are dry, as often there is a worm in the stem, which will never dry unless it is removed. A boy is generally told off to examine the bundles as they are brought in, as, if a damp leaf gets into the staple, or baulk as it is called in the States, it means spoilt tobacco, as spontaneous combustion sets up in a small way. After the tobacco reaches the shed, as we will call the fermenting house, it must be put into staples at once, as it is apt to heat in the baskets. The first staples are generally about ten feet long by two feet high and the same dimensions broad, but this depends on the amount of tobacco to be handled during the day. In any case it is not wise to make the staple higher than two feet at first, as it is an easy height to pull down in case of any damp tobacco getting in. In two days' time it will be found that the centre of the heap is quite hot. It must now be turned and mixed with the next heap, care being taken to get the middle or hot part of each heap on the top and bottom of the new staple, so that all the tobacco can get the same heat, and be properly fermented.

The next stage will be getting the tobacco into big staples, say six feet each way. In order to take the temperature properly, it is necessary to place a thermometer into the centre of the staple when the bulk is three feet high. This should be enclosed in a hollow bamboo or small box. The temperature must be taken daily, in the morning, and, with doubtful staples, several times a day. A staple should not rise more than one degree a day if everything is all right, but if the temperature starts to go up too quickly, the sooner it is opened the better, as there is something wrong. The process of fermenting and sorting is far too complicated to go into thoroughly in an article like this, and can only be gained by experience.

Cigar covers are sorted into some twenty grades of good and four or five of broken leaf. Any leaf having a hole in it goes into the broken grade, and means loss of value. The

sorted leaf is made into bundles of forty to fifty leaves, and then measured into lengths, the biggest leaf naturally fetching the best price, according to grade, as more wrappers can be cut from it.

Of course these remarks refer in general to the cultivation of the leaf in Sumatra, so the planter will have to adapt himself to the Rhodesian conditions. It is impossible at present to tell how the dry season here will affect the fermentation, as in places like Sumatra and Cuba during the tobacco season one can handle the leaf all day long. One thing is certain, and that is that Sumatra tobacco must be planted early in the season, so as to get the full benefit of the rains, otherwise it will produce a thick dry leaf, which would be useless as a wrapper. A good wrapper looks like a very fine dark kid glove when stretched across the fingers. There is no reason why Sumatran seed should not do well in some parts of Rhodesia, especially in the more tropical districts where there are heavy dews. Tobacco growers are well aware that the nature of soils to a considerable degree influences the colour of tobacco leaf, the light soils producing a lighter cigar leaf than the richer and darker soils.

The time of harvesting, and manner of curing, have all to do with fixing the various grades of tobacco, and what is successful in one country is a failure in another, but more important is the intelligent cultivating of the plant and its proper fertilisation.



PLATE I.
Tobacco Miner Moth and Mined Leaf.]

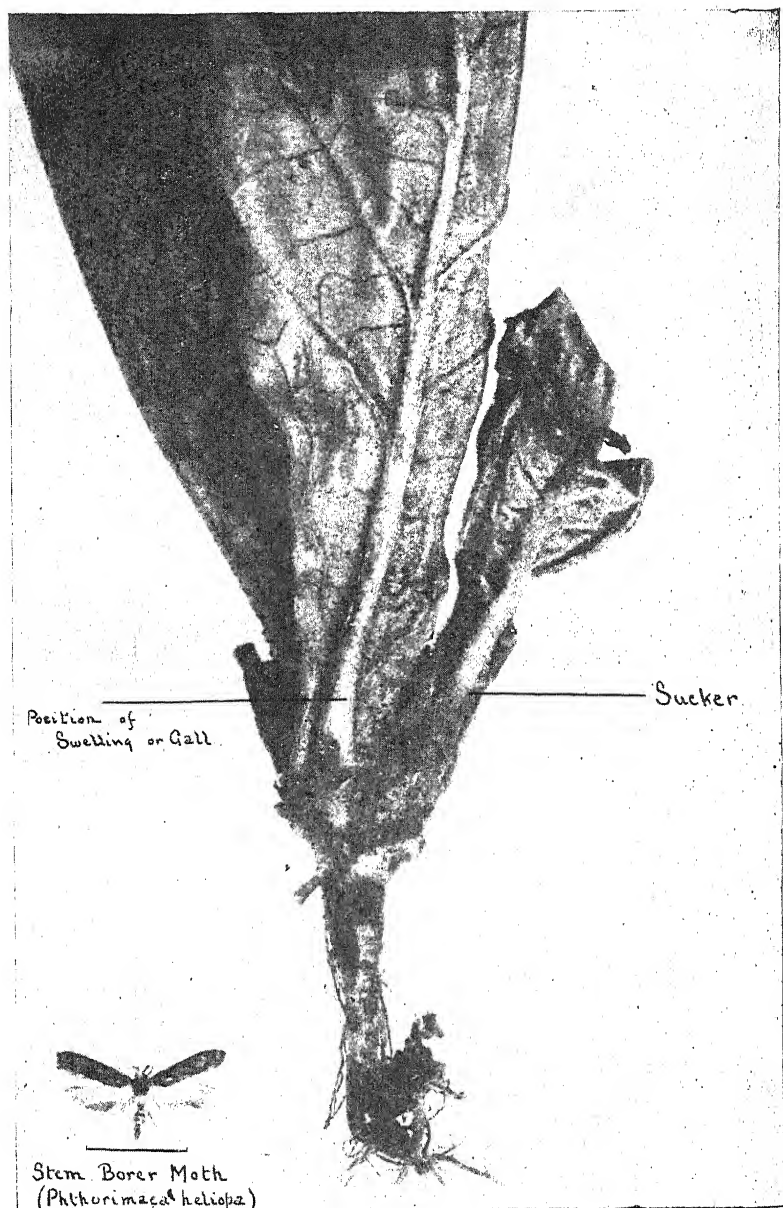


PLATE II.
Stem Borer Moth and Bored Plant.

Tobacco Miner and Stem Borer.

A CORRECTION.

By RUPERT W. JACK, F.E.S., Government Entomologist.

In the December number of the *Rhodesia Agricultural Journal* an unfortunate error occurred, which it is now desirable to correct. In an article from the writer's pen on "Two Enemies of Tobacco," the production of swellings on stems of tobacco plants was attributed to the "tobacco miner" (*Phthorimæa operculella* Z.) otherwise known as the "splitworm," and "potato tuber moth." From information recently received from the British Museum, it appears that the work of two closely allied species has become confused, and that the moth which causes swellings in the stems is one which has been given the name "tobacco stem borer" in India, the scientific name being *Phthorimæa heliopa* Lwr. Both species were bred from tobacco plants with swellings on the stems, but as in America, where only *P. operculella* exists, this form of injury has not been recorded, there seems to be no doubt that stem swellings are caused solely by *P. heliopa*, the presence of the "tobacco miner" not stimulating the plant tissues to the formation of galls. In the plates illustrating the article on "Two Enemies of Tobacco," the swollen stem of the plant on Plate I. has been caused by the "tobacco stem borer" and not by the "miner," and the same remark applies to the injury to the field of tobacco shewn on Plate II.

Two plates illustrating the moths of *P. operculella* and *P. heliopa* are adjoined. These figures shew well the similarity between the two insects in size and shape, but in nature the resemblance is not so close as appears in the photographs, the colour of *P. heliopa* being light reddish brown without distinct markings on the wings, whilst *P. operculella* is darker and

amongst other markings bears an interrupted dark line near the lower border of the fore wings. The larvæ (caterpillars) are much more difficult to distinguish.

This information reduces the supposed scope of the "tobacco miner's" capability for damage, the "stem borer" being the more injurious insect of the two.

The preventive measures and remedies are, of course, unaffected by the fact that a different species is involved, with the exception of the fact that the "tobacco stem borer" is not known at present to breed in either the tubers or plant of the potato, or in the wild "Stinkblaar" (*Datura stramonium*); but, as the insect can scarcely have been introduced from overseas, it is probable that it breeds in certain wild solanaceous plants in this country.

Mr. H. Maxwell Lefroy, in "Indian Insect Pests," gives the following account of the "tobacco stem borer" in India.

"The most serious pest of growing tobacco is a small whitish caterpillar, which is found tunnelling in the main stem, causing a peculiar gall-like swelling. The caterpillar enters at the axil of a leaf or tunnels down the mid-rib of the leaf until it reaches the stem; apparently it hatches from an egg laid on the stem or on the leaf, but this egg has not been found.

"Having entered the main stem, it tunnels in the tissues, which swell and undergo abnormal growth, producing a distinct and characteristic knot. Within this swelling the caterpillar lives until it is full grown, when it prepares an exit hole for the future moth and turns to a pupa inside. The moth is a small brown insect, the wings narrow and fringed, not easily distinguishable from the many small moths of this family which are found in the fields.

"Tobacco is a crop of which great care is taken during the growing period, so that cultivators are aware of this pest; when they find this swelling, they make a cut into it with a knife, believing that the admission of air will kill the insect. Apparently the pest is not injurious to healthy vigorous tobacco, but is worst in a season of drought. It is common in various parts of India, and Mr. Green reports it from Ceylon. Where the

pest is seen so late that the emerging moths could not produce a new generation in the tobacco, only plants that are useless should be removed and burnt. No treatment, except perhaps that of cutting open the plants, can check the insect in the stem. The pest can be looked for in experimental tobacco cultivation, where varieties are grown side by side, and causes a considerable amount of harm under these circumstances."

Many growers in this country think that this insect only does serious damage when it attacks the seedlings in the beds and these are planted out on to the land, but this is a doubtful point. Investigations to determine the effect on the plant of infestation by this insect *after planting out* are at present proceeding at the Agricultural Laboratories, and it is hoped to publish information on the matter at a later date.

Redwater Treatment.

A moderate dose of physic :—1 to 1½ lbs. of Epsom salts ; attend to bowels throughout, and see that constipation does not occur.

Give green food, linseed, bran, etc.

100 to 200 C.C. of one per cent. solution of trypan blue may be injected ; this cuts short the attack of redwater, but from other points of view is disadvantageous.

An ounce of chlorate of potash may be given in the water daily with beneficial results, or 30 grains methyl arsenate of soda twice a day.

As a rule mild cases, generally seen in Colonial cattle, recover, if bowels are regulated and animals carefully nursed.

Citrus Fruit Growing as a Commercial Industry in Southern Rhodesia.

By CHAS. E. FARMER, Citrus Expert to the B.S.A. Co.

During the last two months I have travelled over several districts of Southern Rhodesia with the sole object of examining the nature of the various soils, and the progress made by those who have already interested themselves in the growing of oranges and lemons. While I am conscious of the fact that two months in a new country is not sufficient time to gain all the information necessary, I think it may interest many of the readers of the *Agricultural Journal* to know what my impressions are as to the possibility of growing these fruits in this country, and making the industry a profitable one to the grower. I am encouraged in thinking this from the fact that a large proportion of the farmers I have met since I have been in the country already have small groves of these fruits, and shew a great deal of interest in them. Such knowledge as I have is purely practical, and gained from my own experience of growing oranges and lemons, chiefly the former, for 18 years in Florida, U.S.A., where these fruits are grown exclusively, and not as a side-line in conjunction with other farming, the soil being a pure sand, and too unfertile for farm crops which have to compete in the market with those grown on richer soils elsewhere.

Rhodesian farmers have this advantage, that their acreage is large, and the laying-out of a small portion of it in fruit trees need not interfere with their usual farming operations. Citrus fruits will grow on almost any kind of soil, provided it is sufficiently well drained. Where the drainage is poor and the land lies wet through a portion of the year, the temperature of the soil is lowered, and this is not good, as these fruits depend as much upon heat and moisture as upon fertility. The chocolate and brown loam soils near the rivers, where the banks are

high and the natural drainage consequently good, are excellent sites for orange groves, and on such I have already on several farms seen orange trees, which, five years from planting, and grown without the application of manure or fertilisers, could not be equalled for size and bearing capacity with trees of seven years in Florida, in which country two applications a year of commercial fertilisers are given. However, this class of soil is often the best on the Rhodesian farm for mealies and other farm crops more dependent on inherent fertility than the orange. Therefore, where there is other lighter and more sandy land available, it may be wiser to use this as a site for citrus trees, and especially for the lemon. The lighter lands are more porous, are easily cultivated, and the soil temperature is more uniform—advantages which, in the case of citrus fruits, balance up the loss of some fertility. On such lands the frequent stirring of the soil and cultivation required by fruit trees, together with the turning under of leguminous cover crops, greatly improves the fertility and the quality of the fruit grown thereon, judging by results obtained in other citrus fruit-growing countries. While in the Marandellas district, I was much struck with the clean, fine texture and appearance of the lemons grown upon the granite soil. They are of a good commercial size and equal to any I saw during a recent visit to Sicily.

The ideal climatic conditions for the growth and ripening of citrus fruits prevail in Rhodesia. The rainy season occurring, as it does, during the warm and growing portion of the year, and ending when the fruit is near maturing—dry weather continuing for the ripening of the crop—ensures fruit of sound carrying quality and excellent conditions for gathering and packing for market. These are the general climatic conditions of Florida. Oranges sent from that country to New York by rail, a distance of 1,500 miles, and across the Atlantic to Liverpool, arrived in the English markets without any complaints of rot or bad condition from the consignees. Those sent from California to England have to travel double this distance by rail before they reach the Port of New York. Light frosts through the cool season sweeten and improve the quality of the orange, and are an advantage. Just how low the temperature may fall without injury to fruit or tree, depends a good deal on the conditions of moisture prevailing at the time. A tempera-

ture which would do injury after a light rain would be quite harmless under dry climatic conditions. While it may be advisable to be on the safe side, and to protect young trees planted in a low location with a covering of grass for the first two years, I see no evidence of frosts occurring in Rhodesia heavy enough to be a menace to the citrus fruit industry, and from enquiries made of the oldest growers of these fruits, I find the subject of frost enters very little into their calculations, and they have kept no actual records.

Perhaps the most important point in connection with this industry to be determined by the Rhodesian grower is that of irrigation. The actual amount of rainfall needed to produce a crop depends on various factors. The most important of these is the character of the soil and its power of retaining moisture, while the system of cultivation pursued, and also the amount of shelter the trees have from the dry winds which prevail through the rainless months of the year, are important factors.

Where water is available, it would be advisable to select a site within reach of it; but it is evident, from what I have seen, that trees will make a fine growth and can be brought to the bearing age without irrigation, if the land is ploughed once a year and the surface kept loose and well cultivated through the dry months. Whether, as large full-bearing trees, and with a root system extensive enough to sap the whole space allotted to them, the rainfall of Southern Rhodesia is sufficient to enable them to set and hold full crops of fruit every year, is a question which only experience will determine. Personally, I am of opinion that groves, well sheltered, and the soil kept in condition to take in the rains, with as little "run off" as possible, and the moisture afterwards conserved by frequent cultivation of the surface, would produce remunerative crops without the artificial application of water.

It has been the experience of growers in the older citrus fruit-producing countries that no one variety of orange is especially adapted to all parts of the world where the fruit is grown. The Bahia or Washington Navel, when sent from Brazil to California, improved in quality in that country, and became its leading orange, but proved to be of little value when grown in Florida and the West Indies. After the first disastrous "freeze" in Florida in the winter of 1894-1895, many growers

left the State to follow their business in Jamaica, taking with them the Indian River orange and the choicest Florida varieties, with the result that after a few years it was found these varieties did not retain their good qualities when grown under the conditions prevailing in Jamaica. As time goes on, no doubt some particular few of the varieties now being tested in Rhodesia will stand out as best suited to the conditions of soil and climate prevailing here, combining good carrying qualities with others necessary in first class fruit. At present the Washington Navel for an early and the Valentia Late for a later variety stand out, as far as my observations go, as making the best growth, and fruit well in this country.

Very little attention seems to be given to the grape-fruit. This is becoming very popular on the European markets, and should be given a trial in Rhodesia.

Oranges from South Africa are being sent in larger quantities every year to the English markets, and meet with a ready sale at remunerative prices. The few sample shipments that have gone from Rhodesia have been pronounced of excellent quality by the Covent Garden brokers. The quality and appearance of the Rhodesian grown lemons have been especially noticed by them. Both oranges and lemons enter the market at a season when these fruits are not arriving from other countries, with the exception of a limited quantity of summer lemons received from Southern Europe. With this market open to them, with good land costing a mere fraction of what it costs in other countries, a suitable climate and cheap native labour, Rhodesian farmers have the opportunity of adding to their list of crops at a small outlay of capital, the growing of citrus fruits, and an industry which in California is placed at a net value to-day at probably over twenty millions of dollars a year, and the development of which, without the help to the farmer of diversity of crops, has in Southern California brought the price of the average undeveloped fruit land without water rights to as high a price as \$200 to \$250 per acre, and in the valleys of Northern California, where there is risk of loss from frost, to a price of \$50 to \$150 per acre.

Elephant Grass.

A NEW FODDER PLANT.

By O. STAPP.

(Extracted from the Kew Bulletin, No. 7, 1912.)

In the *Rhodesia Agricultural Journal* for June, 1910 (vol. vii., p. 1398), a new fodder grass was described as Zinyamunga or Napier's fodder. It was referred to as a *Pennisetum*, and compared especially with *P. spicatum* (*P. typhoideum*), the well known pearl millet. Last autumn specimens of the grass were received at Kew, and later a chemical analysis of the stalks and leaves was sent by Mr. H. Godfrey Mundy, Agriculturist and Botanist of the Department of Agriculture, Salisbury, Rhodesia.

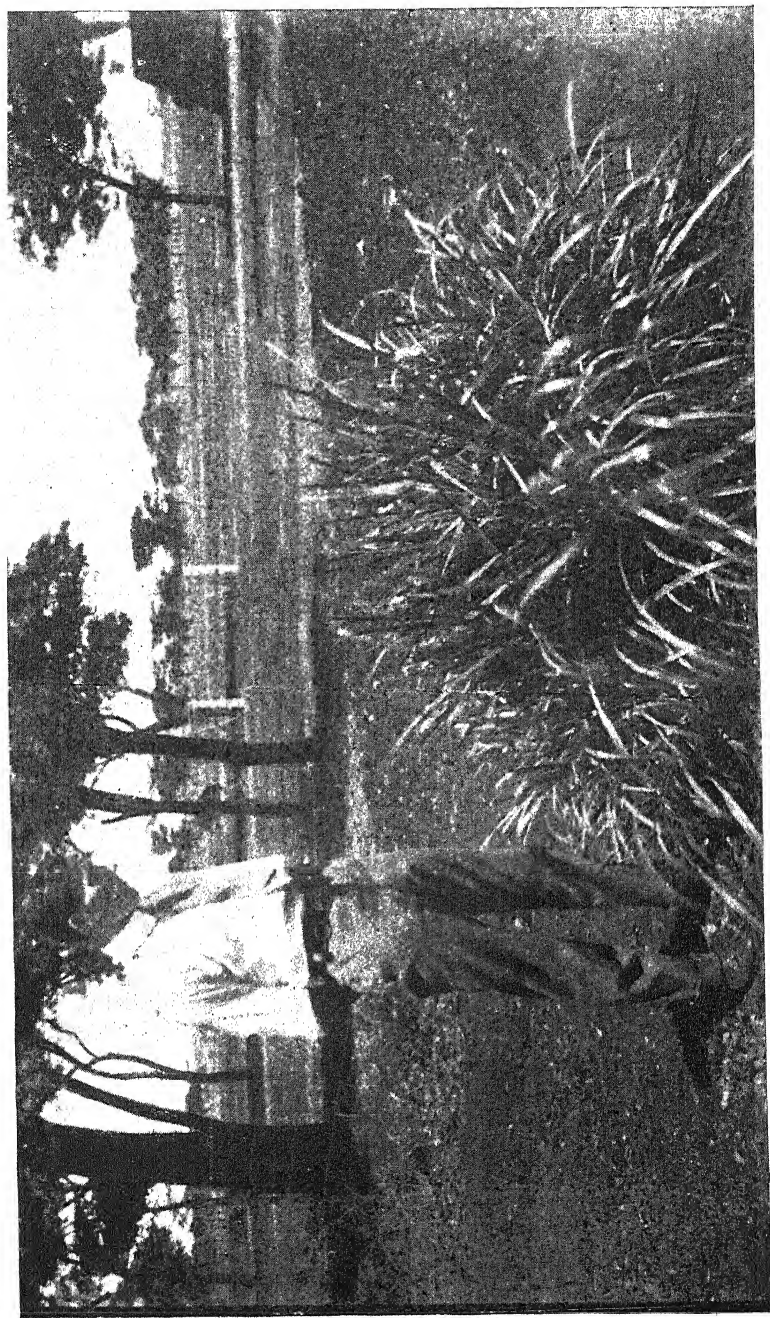
The grass was easily identified as *Pennisetum purpureum*, Schum. (*P. Benthamii*, Steud.), a species of very wide range in tropical Africa; but, common as it is, very little is known about its life history and uses, and even its limits as a species and its differentiation into varieties is not settled. It will therefore be useful to gather in a brief account all that is at present ascertainable about the grass.

As to the name *P. purpureum*, this was given by Schumacher to a plant collected by Thonning on the Gold Coast in the latter part of the 18th century. A specimen from the same collector and answering exactly Thonning's description came from Vahl's herbarium through Nolte to the British Museum, and it may be taken to constitute a cotype. Rendle* has already pointed out that it is identical with Bentham's *P. macrostachyum*,† which, owing to there being already a *P. macrostachyum* by Brongniart, was renamed *P. Benthamii* by Steudel,‡ a name until recently

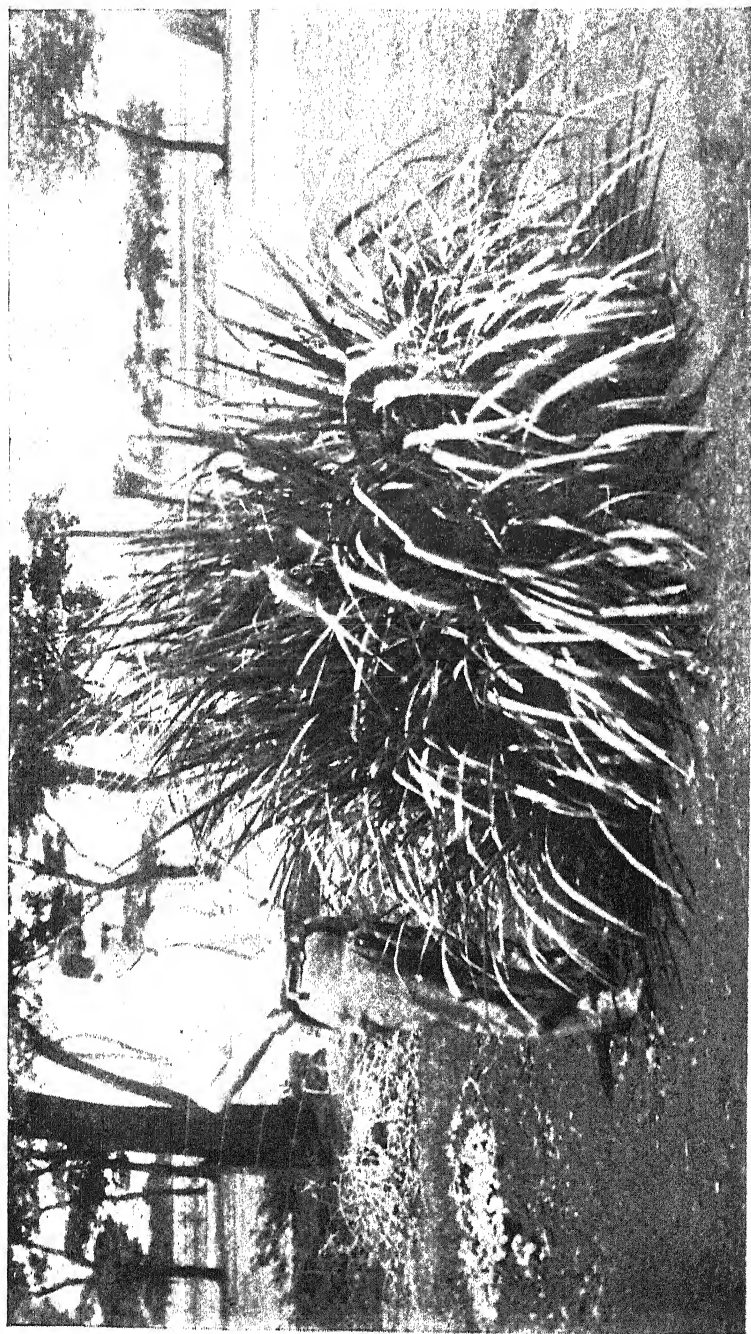
* In Welwitsch, Cat. Afr. Pl. vol. ii., p. 190.

† In Hooker's Nig. Fl. p. 563.

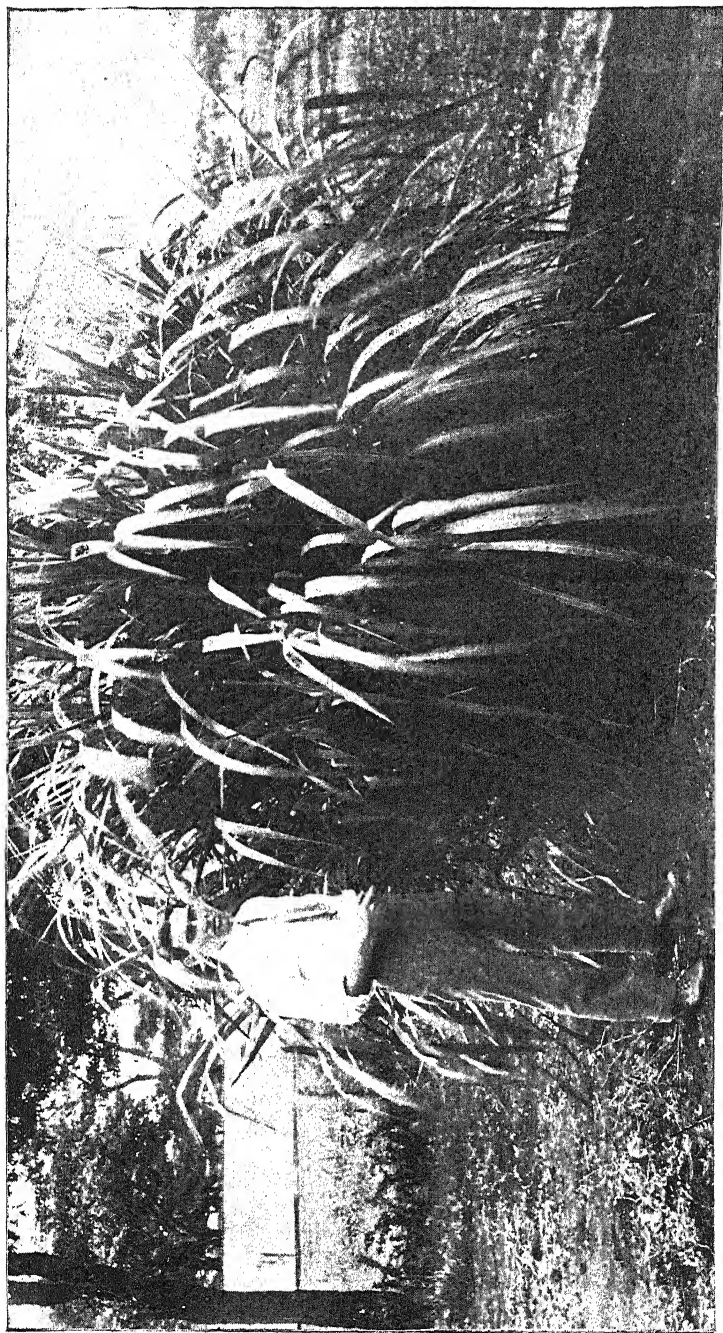
‡ Steudel, Syn. Pl. Glum. vol. i., p. 105.



Elephant Grass or Napier's Fodder, 1st November, 1912.



Elephant Grass at Negeri, India, 6th December, 1912



Elephant Grass or Napier's Fodder, 21st January, 1913.

very commonly used for the grass which is the subject of this article. In fact, Bentham himself was quite aware of the probability of the identity of his and Schumacher's species, but was misled into describing the grass he had before him on account of the absence of the purple colouring insisted on by Schumacher. We now know that no importance attaches to this as a taxonomic character. As to the other synonyms to be referred to *P. purpureum*, one, *P. nitens*, Hack,* rests on *Gymnothrix nitens*, Anderss.,† and represents a robust yellow-spiked state, common in South-East Africa, whilst the other, *P. flexispica*,‡ K. Sch., was based on East African specimens which happened to have a more slender and therefore more flexible rhachis.

DISTRIBUTION.—The area of *P. purpureum* lies between 10° N. Lat. and 20° S. Lat. The northern limit runs from Sierra Leone through the great equatorial forest belt to the Cameroons and the basin of the Ubangi, then to the Nile (at 3° N. Lat.), Lake Victoria and German East Africa, where it reaches the coast in about 5° S. Lat. In the south the area is bounded by a line extending from Loanda in about 9° S. Lat. through Angola to Katanga and then across the Middle Zambesi to Eastern Rhodesia, whence, in about 20° S. Lat., it strikes eastwards as far as Beira. Within this immense area it occurs mainly along watercourses and in marshy depressions, but also enters the bush and forest where open spaces afford sufficient light. Under favourable conditions it forms extensive reed jungles, as, for instance, in the delta of the Zambesi and along the Shire. Even in forests it is locally "only too common," as Welwitsch puts it. In the interior of Sierra Leone it ascends nearly to 900 m., and near its southern limit in the Masetter district of Rhodesia to 1800 m., whilst in the Cameroons it is said to reach even the upper limit of woods. It is in rich marshland where it attains to a height of 7 m. and even more, whilst on drier soil, as in the savannas of East Africa, its culms are hardly more than 2 m.

* In Bolet. Soc. Brot. vi. (1888), p. 142.

† In Peters, Reise nach Mossamb., vol. vi. (1864), p. 552.

‡ K. Schumann in Engl., Pflanzenw. Ost Afr. C. (1895), p. 105.

high. It also appears occasionally on abandoned cultivated land, and has, in a few cases, been observed in a state of cultivation.*

VERNACULAR NAMES.—It is not surprising that a grass of so wide a distribution and striking appearance should have special names in many of the native dialects of Africa. The following is a list compiled from publications and collectors' notes.

Togo: Adá; "Elephanten grass" of German colonists.

Southern Nigeria: Esun funfun (Dodd); Esun (Millen); Esu pupu (MacGregor).

Belgian Congo. Lower Congo: Madiadi (Laurent); Ubanzi District, Mokango: Songo songo (Bouckenaert); Yakoma: Awors (quoted by De Wildeman). Bangala District, Nouvelle Anvers: Sosongo, Libwakanike (De Giorgi). Territory of Rusisi Kivu: Matete (quoted by De Wildeman); Baraka: Mabingobingo (Dohet). Katanga: Dilenge (Verdick).

Angola: Mariango, Marianga, Marianko (Welwitsch, Buchner, Pogge), Massango (Welwitsch), Malenge-lenge, Malanga (quoted by Leeke).

Uganda, Madi: Maweengo-weengo (Grant).

Usambara: Mbuhu, Nguhu (Holst).

Rhodesia, Gutu: Zinyamunga (Kenny), marabagunda,† dumbamunga (Napier), miraba munga (Mundy).

USES.—Of the stems of the grass Grant‡ reports:—"The tall fences surrounding the residences of the Waganda King and people are of this useful reed; the interiors of all Waganda houses are walled into compartments by it. A strip from it is so sharp that it is used for cutting up meat, and also cutting into fragments the victims of the King of Uganda."

The first mention of *P. purpureum* as a fodder grass is in Schinz, *Plantae Menyharthianae*§ (1905), where the grass is stated

* Kaiser, Acc. to Just's Jahresber. 1898, vol. i., p. 561.

† M'ramba munga in the report, reproduced with this article.

‡ Quoted by Oliver in Bot. Speke & Grant Exped. in Trans. Linn. Soc., vol. xxix., p. 172.

§ In Denkschr. Ak. Wiss. Wien, vol. lxxvii., p. 400.

to be good fodder for cattle. The note refers to an observation by Menyharth, a Hungarian missionary who from 1889 or 1890 to about 1894 collected in the neighbourhood of Boruma, not far from the Zambesi in the eastern part of North-West Rhodesia. A remark to the same effect, "Species bovis nutrimentum maxime idoneum," by Leeke* (1907) rests on the authority of Herr Deistel, Government Gardener in the Cameroons, and Pilger in Engler, *Pflanzenwelt Afrika*† (1908) describes it as one of the best fodder grasses.

Independently of those sources, Mr. E. G. Kenny, Native Commissioner, Gutu, and Col. Napier, of Springs, Bulawayo, called the attention of the Agricultural Department of Rhodesia to the value of the grass as a fodder plant.‡ They first noticed it about 1908, "growing in the Gutu district in native lands and being used, as the natives explained, as a muti, or mushonga, to make the other crops grow." It was not growing wild there, and its origin was stated to be doubtful, but Mr. Swynnerton§ states that it grows in the Melsetter district, about 80 miles south-west of Gutu. Col. Napier has experimented with it, and a short account of his experiences, including a chemical analysis of the grass by the Chemist of the Rhodesian Agricultural Department, was published in the *Rhodesia Agricultural Journal* for 1909-1910, from which the following paragraphs are taken:—

(p. 1398.) "Like pearl millet it is reported to be an extremely good drought resister. (p. 1399.) Col. Napier and Mr. Kenny both state that it remains green on dry land late into the autumn and withstands frost to a remarkable degree. Col. Napier has tested it under most severe conditions and is firmly convinced of its economic value. He has now several acres planted on vlei ground on the Central Estates, and is hopeful that in spite of

* Leeke, *Abstamm. u. Heimat. d. Negerhirse*, p. 48.

† In Engler, *Pflanzenwelt Africas*, vol. ii., p. 145.

‡ Rhodes. Agric. Journ., vol. vii., p. 1398.

§ See Rendle in *Journ. Linn. Soc.*, vol. xl., p. 231.

frost it will afford green feed late into the winter. Both cattle and horses eat it readily.*

"Like sugar cane the plant may be propagated either by subdivision of the roots or from cuttings or slips. It roots freely and is reported to grow rapidly after each cutting, thereby enhancing its value as a soiling crop. It seems probable, therefore, that in Napier's fodder we have found a hardy perennial plant of considerable value for winter feed and suitable for planting on light dry soil.

"CHEMICAL ANALYSIS.—The Agricultural Chemist of this Department has made the following analysis of a mature stalk of Napier's fodder which arrived at the laboratories in a partially dried condition, shewing that it is comparable in feeding value to maize stalk roughage:—

	Per cent.
Water	55.33
Ether extract	0.84
Protein	3.10
(Total nitrogen converted to equivalent in protein.)	
Carbohydrates	21.16
Fibre	15.66
Ash	3.71
	<hr/>
	100.00
Ether extract with chlorophyll removed therefrom...	0.57
True protein	2.11

"Since then another analysis was made from material grown on the Botanical Experiment Station,† Salisbury; and this, together with an analysis of sugar cane from the same station, is reproduced below, with the permission of the Agricultural Department, Salisbury, Rhodesia.

* Col. Napier has formed so high an opinion of this crop that it is certainly worth a trial in other parts of Southern Rhodesia, and through his co-operation this Department is able to offer a limited number of roots f.o.r. Gwelo, under the usual terms of co-operative experiments.

† Communicated to Kew in December, 1911.

“Composition of *Sugar Cane Fodder* (*Saccharum officinarum*) and *Zinyamunga Fodder* (*M'ramba munga* or *Napier's fodder*, *Pennisetum* sp.) grown on the Botanical Experiment Station, Salisbury.

Particulars of planting, etc.

			Sample for Analysis.		
			Time Planted.	Collected.	Length of Stalk in Feet. Length of Leaf in Feet.
Sugar cane	...	...	Jan., 1910	July, 1911	2 4
Zinyamunga	...	...	March, 1910	July, 1911	8 2

The fodder had not been cut since planting.

Analysis.

			Sugar Cane Fodder.	Zinyamunga Fodder.
			Per cent.	Per cent.
Water	...	...	73·63	61·81
Ether extract	...	...	0·22	0·29
Protein (Nitrogen X 6·25)	...	...	1·27	2·92
Carbohydrates	...	...	17·73	17·29
Woody fibre	...	...	5·32	14·77
Ash	...	...	1·83	2·92

“The amount of juice expressed from stripped stalks by passage between the steel rollers of an ordinary flattening mill used for rolling out metals was in each case as follows:—

			Sugar Cane Stalks.	Zinyamunga Stalks.
			Per cent.	Per cent.
Juice expressed	...	...	56·6	21·3

“The juice of *Zinyamunga* was tasteless and of low sugar content, whilst that of sugar cane was sweet and contained 6·69 per cent. sucrose (cane sugar) and 2·84 per cent. glucose.”

No analyses of the ash were made at Salisbury, but this gap is fortunately supplemented by Dr. F. Zeller,* of Victoria, Cameroons, who considers the rotting grass as well as its ash

* *Tropenfl.*, vol. xv. (1911), p. 357.

a very valuable manure; and this may actually be the meaning of the statement of the Gutu natives that they plant it "to make the other crops grow." According to him 100 kilogr. of dried grass with a water content of 10 per cent. contain—

1.3 kilogr.	N	corresponding to	6.5 kilogr.	sulphate of ammonia.
2.02	"	K ₂ O	"	4.0 " chloride of potassium.
0.38	"	P ₂ O ₅	"	1.9 " superphosphate.
0.07	"	C ₁₂ H ₂₂ O ₁₁		
0.1	"	MgO		

The best method of propagating the grass is probably by dividing the clumps or from cuttings. No mature seeds have come to hand so far. Searching the ample material of *P. purpureum* at Kew I came across one grain only, and this was not quite mature. Whether this means that the grass actually seeds rarely, or whether it may be that the grains escaped the collectors owing to the extreme readiness with which the spikelets with their involucre detach themselves, I am unable to say.

NOTE.

Napier's Fodder, grown on the Botanical Experiment Station, Salisbury, during the year 1912, has continued to give good results. Plants established from slips in March, 1911, were cut down to ground level in August, in order to provide cuttings for further propagation. The first cutting for forage was obtained in the following February, and further cuttings were taken 30th March, 30th May, and 30th June. With the two former the growth was about 4 ft. in length, but with the two latter only about 2½ ft. in length. No rain fell after the end of April, the total for the season being 21 inches. A few weeks after the June cutting regrowth appeared, and the plants remained green, with leaves several inches in length, throughout the whole winter, strong growth commencing again in October. Under similar conditions Napier's fodder is a more rapid grower, and provides a greater bulk of succulent feed than sugar cane grown with the same object. As will be seen, however, from the analysis, sugar cane is superior in feeding value.

The three illustrations of Napier's fodder accompanying this article shew one root of the plant which, grown in a position not exposed to much frost, and occasionally benefiting by a little overflow water from the storage tanks, made remarkable growth after being cut in July.

As will be seen from the dates, the first photograph was taken on 1st November and the second on 6th December, during which period no rain worth recording had fallen. The third photograph was taken on 21st January. These photographs will indicate the value to a dairy farmer of a small paddock of Napier's fodder grown in a sheltered position, where it can receive one or two little irrigations during the winter months.

There is no longer any doubt that in Napier's fodder we have a really valuable crop for winter feed. It is equally, if not more, drought and frost-resisting than *Paspalum*, and provides a far greater weight of fodder per acre. Hitherto it has been grown on the Experiment Station in rows about 3 by 2 feet apart, and this seems a suitable spacing. Its main value is undoubtedly as a perennial succulent crop for cutting and feeding to stall-fed stock, but as a perennial pasture grass it is by no means to be despised, and we can with confidence recommend it for trial throughout Rhodesia.

H. G. M.

Suggestions for a Simple Method of Farm Book-keeping.

By J. A. T. WALTERS, B.A., Assistant Agriculturist.

The day has gone by when the farmer could afford to work his farm without keeping any definite record of his transactions, financial and otherwise. The commercial aspect of farming, particularly in new countries like Rhodesia, has been developed enormously of late years. To obtain the best value for his farm the farmer must be prepared to shew accurate accounts with reference to his many operations. Nor can anything give greater confidence and satisfaction to the farmer himself than the possession of accurate figures in connection with his stock, crops, labour, etc., which go to shew his financial position from year to year. It is also none the less true that farmers have been deterred from keeping accounts owing to the seeming difficulty and complexity of such clerical work. In the present article the writer has endeavoured to place before the farmer suggestions for the keeping of accounts which shall render it easy and accurate, even for such as have a very limited knowledge of accountancy. The general scheme can be altered or modified to meet individual requirements.

A little thinking will demonstrate that a simple system of accounts for the farm is one that will shew :—

1. The value of the farm, the live stock, the crops, and all the improvements which have been effected since its occupation. This valuation should be taken once yearly, say on the 30th of June, and this we will call the inventory. It is obvious that an inventory taken once a year will shew a farmer clearly whether he is making a profit or a loss on his operations.
2. The expense connected with each operation, such as the rearing of stock or the growing of each crop

each season. These accounts will shew him exactly where the profit or loss is being made.

3. The credit or debts which the farmer contracts with those persons that he has dealings with, such as the storekeeper, the creamery or Co-operative Society.

A day-book and a ledger will suffice to keep these accounts. In the day-book will be entered every transaction as it occurs day by day. These transactions are then copied into the ledger once a week or once a month. Anything may be used for a day-book, but the ledger is the permanent record of the farm transactions, and should be kept with care.

The first entry in the ledger should be the inventory. This corresponds more or less to the stocktaking by storekeepers and merchants. I have suggested that 30th June should be the date at which the inventory will be taken, but any date will do. It is a valuation of all that the farmer has as a farmer, and shews the net value of his farming assets. It will appear somewhat as follows :—

BRACKWELL FARM.

Inventory taken 30th June, 1911.

Live Stock.

18 Oxen	£180
20 Graded Shorthorn heifers	300
18 Native cows	120
1 Shorthorn bull	45
1 Horse	30
2 Mules	50
50 Persian ewes and 2 rams... ..	50
5 Pigs... ..	4
— Poultry	5

£784

Crops.

200 Bags maize	£80
12 Tons velvet bean hay	36
108 Bags peanuts... ..	81
10 Tons ensilage	20

£217

Implements and Machinery.

1 Wagon	£45
1 Trolley	12
2 Ploughs	13
1 Maize planter	10
1 Mower	14
Dairy utensils... ..	25
2 Sets harness and trek gear... ..	27
	<hr/>
	£116

Household.

Furniture, etc., as per list	£125
-------------------------------------	------

Bills Receivable.

From Co-operative Society... ..	£65
From Cook & Sons	37
From Gwelo Creamery... ..	19
	<hr/>
	£121

Bills Payable.

To Williams & Sons (fencing)	£39
To Grocery Bill	22
	<hr/>
	£61

Cash.

In bank	£105
On hand	6
	<hr/>
	£111

Real Estate.

Value of farm, including fencing, dipping tank, wind-mill, stone kraal... ..	£2,160
Loan from Land Bank	850
	<hr/>
Value in excess of mortgage	£1,310

Summary.

Live stock	£784
Crops on hand	217
Implements	116
Household	125
Bills receivable... ..	121
Cash	111
Real estate	1,310
	<hr/>
	£2,674
Less bills payable	61
	<hr/>

Total assets, 30th June, 1911 £2,613

The succeeding accounts will shew the farmer's progress through the year from 1st July, 1911, to 30th June, 1912, when an inventory should again be taken. He will then be in a position to know exactly where and when profits and losses have been made.

We will consider each account in order, and it is hoped that a careful perusal of these will leave the farmer in no doubt as to how it should be done. The left hand side of the account in the ledger is the debit side. Here is entered everything that is received by that account, or, in other words, every payment that is made on behalf of that account is entered on the left hand side. Similarly, when anything is paid or yielded or produced by the account it is placed to its credit on the right hand side. An example will serve to make the matter clear. Take the Live Stock Account. It will be entered on the two sides of the ledger as follows:—

LIVE STOCK ACCOUNT.

<i>Dr.</i>				<i>Cr.</i>			
1911				1911			
Aug.	12 Sacks maize	-	£4 16 0	Oct.	Cream supplied for		
Nov.	Medicines	-	4 10 0		three months	-	£25 0 0
Sept.	12 Sacks maize	-	4 16 0	Nov.	Sale of 2 suckling		
"	1 Sack linseed	-	1 10 0		pigs	-	1 10 0
Oct.	Branding iron	-	1 15 0		Eggs	-	0 15 0
	To inventory, 30th				By inventory, 30th		
	June, 1911	-	674 0 0		June, 1912	-	816 0 0
	To balance	-	151 18 0				
			<hr/>				<hr/>
			£843 5 0				£843 5 0

Note that all the items on the left hand side represent the moneys paid out on behalf of the Live Stock Account. The account is therefore debited with them. The maize and linseed used for feeding purposes were grown on the farm, and it will be seen later that the Crop Account from which these were taken is credited with these amounts. The medicines and branding iron were paid for in cash, and it will be seen later that the Cash Account has been credited with these sums. In a similar way every item credited to one account will be debited to another, and *vice versa*. Note, further, that the Live Stock Account is not credited with any progeny, such as calves, lambs and pigs. These are shewn in the inventory taken at the end of the year, which in this case shews an increased value of £142. Together with the profits made from the sale of cream, eggs, etc., the total profit is seen, by the balance on the debit side, to be £151 18s. Remember that whenever the balance is on the debit side it indicates a profit, and when on the credit side it shews a loss on that account. For the cream and eggs sold, cash has been received. The Cash Account will therefore be debited with these moneys, as will be seen further on.

Crop Account.

In the same way, the Crop Account will be debited with all the expenses that go towards the production of the crops, such as seed, grain bags, money paid for shelling, etc. I propose to omit entirely the cost of labour and use of implements or machinery. The reason for this is that, generally speaking, the farmer cannot estimate with any degree of accuracy how much of the labour was given to crops, how much to stock, and how much to general work. If, however, a gang of boys or white men are taken on especially for one crop, such as tobacco, the Crop Account can be debited with this expense. The result of omitting the labour and implement charges will be that the crops will shew a bigger profit than is really the case. But the farmer will not be deceived by this, as he can estimate roughly what proportion of labour was probably taken up by the crops, and deduct this from the profit shewn in the account. Similarly, he can also deduct the amount of depreciation in the implements or machinery employed in the production of the crop. It is sufficient for us to know that the accuracy of the whole account will not be interfered with by the above.

Dr.		CROP ACCOUNT.		Cr.	
1911				1912	
Oct.	1 Bag seed maize -	£2	0 0	Mar.	Velvet bean hay - £36 0 0
"	Ordinary maize seed -	7	10 0	"	108 bags peanuts - 81 0 0
Nov.	Velvet bean seed -	2	10 0	Apr.	6,000 lbs. tobacco - 300 0 0
	Peanut seed (10 acres) -	2	5 0	"	15 tons ensilage - 22 10 0
	Tobacco seed, etc. -	6	15 0	June	800 bags mealies - 320 0 0
	8 boys for 9 months on tobacco work -	72	0 0		
1912					
Feb.	900 Grain bags -	22	10 0		
	Balance - - -	644	0 0		
		<u>£759</u>	<u>10 0</u>		
					<u>£759 10 0</u>

Implement Account.

Owing to the difficulty of estimating the value of the work done by a plough, a baler, or grinding machine, I would suggest that the Implement Account should be credited with nothing at all. The amount of depreciation will be plain from the inventory at the end of the year, and this amount can be deducted from the profit shewn in the Crop Account, should the farmer desire to find out very exactly what the profit on any crop was. Thus, supposing the inventory on 30th June, 1912, shewed that the depreciation in the value of the implements was £52, it is evident that the farmer will set this against the £644 profit shewn in the Crop Account. The Implement Account will be debited with all new implements bought during the twelve months. This account then will appear somewhat as follows:—

<i>Dr.</i>	IMPLEMENT ACCOUNT.	<i>Cr.</i>
1911		
July	6 Spades - - £1 7 0	
Aug.	Repairs to harness - 0 10 0	
Oct.	Fertiliser attachment 2 10 0	
"	4 Ploughshares - 1 10 0	
Dec.	2 Anticlog weeders 8 5 0	
1912		
Feb.	1 Peanut harvester 27 10 0	
	To inventory, 30th	By inventory, 30th
	June, 1911 - - 116 0 0	June, 1912 - - 105 12 0
		By balance - - 52 0 0
	£157 12 0	£157 12 0

In this account, "By Balance, £52," indicates that the total loss on implements by wear and depreciation amounts to £52. Whenever the balance is on the credit side, as in this case, it indicates a loss. This loss will be charged up by the farmer partly against his crop profits, partly against his live stock profits, according as the implements have been used for one work or the other.

Labour Account.

Here, as it is a case of money paid out and nothing received, the entries will all be on the debit side. Properly speaking, the Labour Account should be credited with the services rendered to the Crop Account and the Live Stock Account, but owing to the difficulty mentioned above of dividing it up accurately between these accounts, it will be best for the sake of simplicity to credit it with nothing at all. Note again that any labour especially employed for any particular crop can be entered against that crop, and would then not be entered here.

LABOUR ACCOUNT.

<i>Dr.</i>		<i>Cr.</i>	
1911			
July	To cash—10 boys' wages - - - £10 0 0		
„	To cash—food - - - 2 10 0		
Aug.	„ 8 boys' wages - - - 8 0 0		
„	„ food - - - 2 5 0		
Sept.—	{ „ 10 months' wages - 108 0 0		
June,	{ „ wages - 108 0 0		
1912	{ „ food - - 24 0 0		
		By balance - - - £152 15 0	
	£152 15 0		£152 15 0

Remember always that the Cash Account is *credited* with these sums. Similarly, in the next account, which is the last connected directly with the farm, the moneys are all credited to Cash.

Household and Incidental Account.

Here are entered the various expenses connected with living, travelling, etc. Here again the entries will all be on

the debit side. It will be remembered that an inventory of the household furniture was taken on 30th June. To this account should be charged all food, furniture, and other expenses connected with living.

HOUSEHOLD AND INCIDENTAL ACCOUNT.

<i>Dr.</i>			<i>Cr.</i>		
1911					
July	To cash—Groceries	£11 10 0			
Sept.	„ Butcher -	3 7 0			
Dec.	„ Visit to Salisbury	5 13 0			
1912					
Feb.	„ Piano (James and Sons)	37 10 0			
Mar.	„ Wood & Co. bill	42 0 0			
		<hr/>			
		£90 0 0	By balance	-	£90 0 0
					<hr/>
					£90 0 0

The above accounts will probably suffice for the ordinary operations of the farmer, but there is no reason why he should not open up any other account, such as a separate account for cattle and sheep, or maize and tobacco. Sometimes an Improvement Account is opened for such things as fencing, the erection of dipping tanks, and windmills. *The essential thing is that all expenses and receipts should be entered twice, once to the credit of the account which furnishes them, and once to the debit of the account which receives them.*

This system of entering every account twice, once on the debit side and once on the credit side, is a great safeguard against error. It also means necessarily that the total amount on the credit sides will be equal to the total amount on the debit sides, and if these totals are added up and found equal, it signifies that there is no error in the account owing to a wrong entry or an entry wrongly placed.

The only other accounts which the farmer will keep (with the exception of the Cash Account) are the Personal Accounts kept with the storekeeper, the Co-operative Society, or the creamery. Two instances will suffice.

GWELO CO-OPERATIVE SOCIETY.

Dr.		Cr.	
1911		1911	
July 1	Balance due on last year's account - £65 0 0	Oct.	By cash - - - £50 0 0
1912		1912	
May	600 Bags maize - 240 0 0	June	„ - - - 110 0 0
			165 0 0
			By balance - - - 140 0 0
	£305 0 0		£305 0 0

The Crop Account shewed that 800 bags of maize had been grown. Only 600 of these were sold, the remaining 200 were fed to the stock, and the Live Stock Account was duly debited with them month by month. The Cash Account receives £165 in this case. It will consequently be debited with this sum. The balance of £140 will be shewn in the Inventory on 30th June, 1912, under Bills Receivable.

WILLIAMS & SONS.

Dr.		Cr.	
1911		1911	
Sept.	To cash - - £20 0 0	July 1	By bills payable (see Inventory) - £61 0 0
Dec.	„ - - 25 0 0	Aug.	1 Suit clothes - 3 5 0
1912		Oct.	2 Pairs boots - 2 10 0
Mar.	„ - - 15 0 0		
	60 0 0		
	To balance - - 6 15 0		
	£66 15 0		£66 15 0

Thus the Inventory on 30th June, 1912, will shew Bills Receivable from the Co-operative Society for the amount of £140; and Bills Payable to Williams & Sons for £6 15s. In the actual Inventory for 30th June, 1912, shewn at the end, the Bills Receivable have increased to £208, and the Bills Payable to £187 10s.

We now come to the last and most important account—the Cash Account. This is the account which deals with the actual handling of money, in the form of payments or receipts. Here, on the debit side, will be shewn all moneys *received* from the sale of goods produced on the farm, such as cream, butter, eggs, mealies, hay, calves, pigs or anything else that is sold and for

which money is received. Similarly, all moneys *paid* for the purchase of implements, machinery, food, furniture, cattle, wages or anything else that is paid for will be entered on the credit side of the account.

CASH ACCOUNT.

<i>Dr.</i>		<i>Cr.</i>	
1911		1911	
July 1	To cash in hand, as per inventory - £111 0 0	July 6	Spades - - £1 7 0
Oct.	To Creamery, Gwelo 25 0 0	"	Groceries - - 11 10 0
"	To Gwelo Co-operative Society - 50 0 0	Aug.	Repairs to harness 0 10 0
Nov.	Grand Hotel—2 pigs 1 10 0	Oct.	Bag seed maize - 2 0 0
"	" " eggs 0 15 0	"	South & Son—fertiliser attachment 2 10 0
1912		"	Wood & Co. — 2 ploughshares - 1 5 0
Mar.	Klondyke Mine, for 108 bags peanuts 81 0 0	Nov.	Medicines - - 4 10 0
May	To Tobacco Co., for 6,000 lbs. tobacco 300 0 0	Dec.	By labour (6 months) and food - - 72 10 0
June	Gwelo Co-operative Society - - 110 0 0	1912	
		Feb.	1 Peanut harvester 27 10 0
		April	Household—piano - 37 10 0
			161 2 0
		By balance - -	518 3 0
	£679 5 0		£679 5 0

For the sake of brevity and simplicity, I have omitted from the Cash Account some of the items mentioned in the foregoing accounts. The above account shews a balance at the bank of £518 3s. In the farmer's accounts, where nothing is omitted, a Trial Balance will shew if any errors have been made. This consists in adding the total amounts on the credit and debit sides separately, and if they are equal, it is presumed that no error of entry has been made.

At the end of the twelve months, *i.e.*, on 30th June, 1912, a new Inventory will be made. This will shew the farmer exactly how he stands in comparison with 30th June, 1911. This date is quite arbitrary; any other date may be chosen if the farmer prefers it. The Inventory will probably shew an increase in the value of live stock, crops and Cash Account. It will probably shew a decrease in the value of Implements and Machinery, due to depreciation, unless a large quantity of new implements have been bought. A Summary of the Inventory might shew as follows:—

30th June, 1912.

SUMMARY OF INVENTORY.

Live stock... ..	£816	0	0
Crops on hand	230	0	0
Implements	64	0	0
Household... ..	152	0	0
Bills receivable	208	0	0
Cash... ..	518	3	0
Real Estate... ..	2,160	0	0
	<hr/>		
	£4,148	3	0
Less Bills payable... ..	187	10	0
	<hr/>		
Total Assets 30th June, 1912... ..	£3,960	13	0
Total Assets 30th June, 1911... ..	2,613	0	0
	<hr/>		
Gain	£1,347	13	0

I would suggest, lastly, that the farmer should have his accounts audited by a professional accountant at the end of the year. If the opening of the ledger is likely to give trouble, an accountant might be asked to do this too. It is certain that once the farmer is accustomed to keep accounts regularly and accurately, he will no more think of doing without them than would a merchant.

Gall Sickness.

Commence treatment by giving 1 lb. of Epsom or Glauber salts and two pounds of treacle in two bottles of warm water.

Great attention should be paid to the bowels throughout. Green food and linseed will assist in preventing constipation. Enemas will be found very useful.

A tonic powder, consisting of 60 grains sulphate of iron and 15 grains methyl arsenate of soda, may be given twice a day in a little oatmeal gruel.

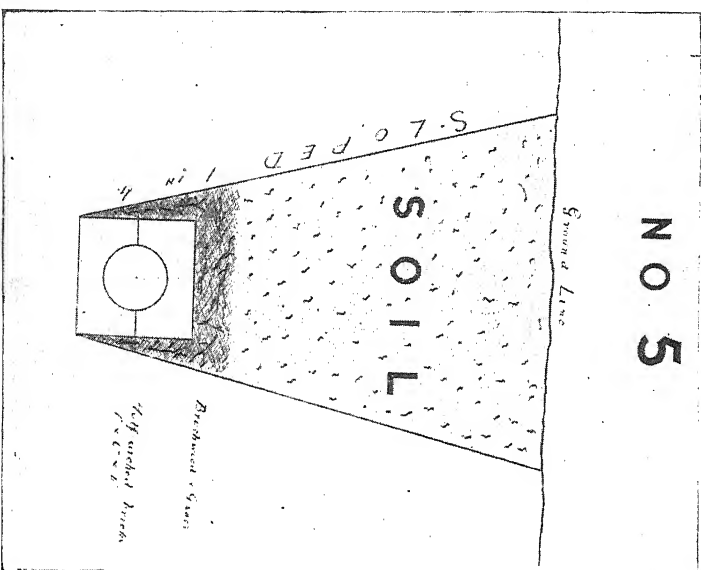
Drainage for Irrigated and Swampy Land.

By W. M. WATT, Agricultural Engineer.

It may seem somewhat anomalous, in dealing with the application of water to land, that it should be necessary to treat of such a converse proposition as drainage or the withdrawing of water from land. It is almost an axiom, however, that irrigation and drainage must go hand in hand. Too much water to the land may cause supersaturation and waterlogging, with the inevitable consequence that the land turns sour. Noxious alkaline salts may be brought to the surface by the same cause, and these will undoubtedly militate against the growth of most plant life; and, further, badly drained or swampy ground in such a territory as Southern Rhodesia will be a breeding spot for the anopheles mosquito, and a source for the spreading of malarial fever.

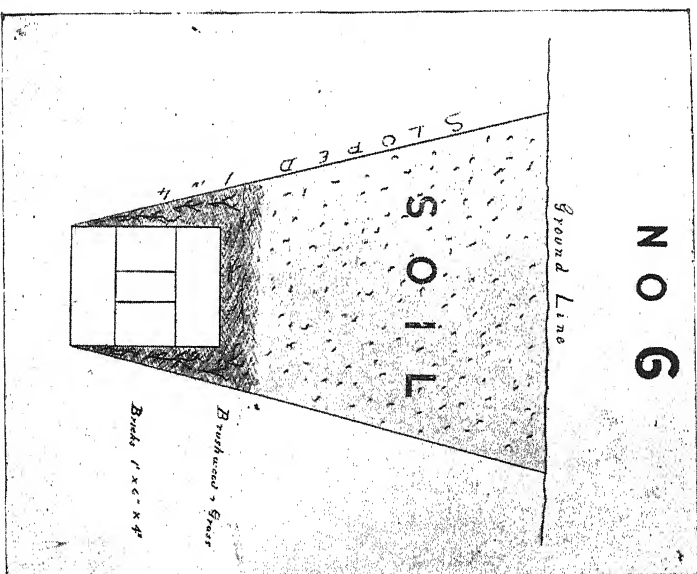
In treating of this subject I shall first speak of "when not to drain." As an instance: take a farmer who has a granite vlei which retains its moisture through the dry season. He contemplates draining it to irrigate land lower down, or so that he may plant mealies on the drained area. Now, if the vlei is naturally damp it seems like double work to drain it to irrigate dry land below; unless, of course, the dry land is of very much better quality. To drain it for the planting of mealies, when other crops such as rice, wheat, oats, potatoes, etc., might be grown in the dry season on the undrained land, and give higher returns than a mealie crop, is unlikely to prove economical. Again, our damp vleis are really sponges containing a certain quantity of water. If thoroughly drained, the effect of this drainage may just be to take away the water held up by the vlei, in a shorter period, so that the vlei may become dry in the middle of the dry season, and little or no water be available

NO 5



Arched Brick Drain.

NO 6



Flat Brick Drain.

towards the latter end of it, when it may be most wanted. It is only fair, however, to state that there may be good reasons for draining such vleis, and having touched upon the matter of "when not to drain," I shall pass on, to deal with the main title of this article.

During my travels in Southern Rhodesia I have seen very little "brak" (alkaline salts), and only insignificant patches really detrimental to plant life, so I shall treat of the matter briefly. The principal alkalis detrimental to plant life found in the soil are sodium chloride (common salt), sodium sulphate (Glauber's salt), and sodium carbonate. The first two of these give a white efflorescence on the surface when the surface is dry. They are soluble in water, and may be removed in time by leaching with water, and carrying them off in solution by pumping or by means of drains. The third, sodium carbonate, or, as it is commonly called, "black brak," shews a dark crystalline brown on the surface. It is insoluble in water and very detrimental to plant life, and much more difficult to get rid of than the two "white braks." The method commonly used is to give frequent dressings of about 500 lbs. per acre per annum of gypsum, which has the effect, when water is applied, of changing the sodium carbonate into the soluble, and less harmful, alkaline salt sodium sulphate (Glauber's salt). This can then be reached with water, and gradually passed off by the drains. In bad cases it may take about one ton per acre of gypsum to convert the carbonate into sodium sulphate, and the individual farmer must himself decide whether the return is likely to exceed the cost of this application. Except in exceptional cases, I do not think it will.

The chief cause of "brak" is due to a shallow and impervious sub-soil. When water is applied to the surface soil, it is held up by the sub-soil, and as evaporation takes place on the surface of the ground, the remaining water rises by capillary attraction, is in turn evaporated, leaving the alkaline salts on the surface. Without resorting to drainage, a great deal can be done to keep "brak" under control. Firstly, by thorough cultivation so as to keep the soil well mulched, and thus to break the capillary tubes near the surface and prevent excessive evaporation there. This remedy is useful, as "brak" does most harm on the surface. Secondly, a chemical treatment of white

"braks," by treating them with ordinary lime, and black "brak" by the same method, after it has been converted into the soluble sodium sulphate by a previous application of gypsum. And thirdly, by planting shady plants, such as lucerne, to prevent excessive evaporation.

Waterlogging, like alkali, is also accounted for by defective drainage. In this country waterlogged soil is very common in vleis, and is generally recognisable by its greyish white appearance, usually called by farmers "sour land." To stop waterlogging or "brak," drainage and thorough cultivation, combined with the careful application of water, are undoubtedly the best remedies.

Drains are of two distinct kinds: the open drain and the closed drain. The former has the advantage of economy, but gives a good deal of trouble to keep from caving in, and from weeds, and has the further effect of cutting up the land, thus rendering ordinary cultural methods rather awkward. The closed drain, despite its initial cost, is the one in most general use. There are several types of closed drains, all of which pertain to that known as the French drain. The following are a few types: boulder drain, stone drain, wooden drain, perforated pipe, arched brick, flat brick.

Wherever possible drains should have a fall of not less than 1 in 250, and should have a depth from the surface of from 3 to 6 feet, according to the class of crop to be grown. Before laying out the drain, it will prove of great advantage to sink a few small pits at frequent intervals (say 30 yards apart) a few feet below the sub-soil water. Gauge posts should be erected in these holes, and the height of the sub-soil water be carefully and systematically recorded before and after rains or irrigating. These records will be found very helpful in deciding upon the depth and alignment of any drainage system, and by further observation after the system has been carried out, will shew whether it is working satisfactorily or whether more drains will be required.

Operations and Maintenance of Irrigation Systems.

The following abstracts, from a paper presented before the Twentieth National Irrigation Congress, by F. H. Newell, Director of the United States Reclamation Service, and appearing in the "Engineering Record," may be of interest:—

Since the enactment of the Newlands, or Reclamation, Act in 1902, careful studies have been made of the problems that arise in the operation of irrigation systems, and an attempt has been made to expose fallacies that have militated against their successful operation. The present paper is a brief review of the progress made since the enactment of the law, and certain suggestions are made with a view of increasing still further the efficiency of irrigated lands.

The total expenditures by the Government during the past ten years have aggregated about \$75,000,000, and about 10 per cent. of this expenditure has been realised from the sale of water during that time. The returns are increasing steadily, and are being used over again in the construction of additional works.

On the 23 projects upon which construction is well advanced, 564,041 acres were irrigated in 1911, and, if the farmers had utilised the opportunities offered, there would have been nearly double this area, as water was provided for 1,015,494 acres.

OPERATING PROBLEMS.—Similar obstacles are encountered whether the reclamation work is being conducted by corporations or by the Government. The financial problem is not as acute with the Government as with other investors, and there is not the large promotion cost and profit which forms such a notable item in private enterprises; but the Government is borrowing money, and must provide for its return with interest.

In the matter of construction, owing to the pioneer character of the work, it has been practically impossible to ascertain in advance, with any considerable exactness, the cost of the works to be built. The Government now has the advantage of ten years of experience, and, in future construction, can make use of the organisation and experience thus obtained in securing more economical construction.

One of the important problems on all such work is that of securing desirable and successful settlers on the lands. There is no difficulty whatever in getting some settlers, but, on the Government projects, as well as on those privately controlled, the average crop production is not what it should be. There are hundreds of thousands of acres of land for which water has been provided which are not being used, and which are not returning the cost of the investment. The success of reclamation and of the investments made in it are directly dependent upon the success of the farmer who is cultivating the fields.

Unless he is doing this in an intelligent and effective manner, he cannot raise crops of sufficiently high value to enable him to support his family and to pay his debts. We should not shut our eyes to the fact that the ordinary crops now being raised by the average farmer under the larger projects are not sufficiently remunerative to enable him to do this. As a rule, each irrigator, and the community as a whole, should specialise on improved varieties of crops, and adapt the methods to secure a larger crop yield.

There are plenty of examples of large success by groups of farmers practising irrigation where the crop yield is above the normal. Here it will be seen that the success has been attained with some special variety of product. On the other hand, it appears that where the farmers have adhered to the old crops, and have brought in the old methods on the new projects, they are not getting ahead, and are not able to pay their debts and make returns on the investment.

PAST FALLACIES.—A striking fallacy, largely accepted at one time, was that concerning the low cost of reclamation by irrigation. Before the Reclamation Act was passed, it was assumed that irrigation was a relatively cheap matter, and it was even proposed that no project should be undertaken which

would cost more than \$5 per acre, and in one law actually passed at about that time a limit on the particular project was set at \$6 per acre.

A little later, the statement was made that \$20 per acre should be the limit, and this was then increased until at the time of the investigation by the Senate and other committees, statements were frequently made that the lands would stand \$50 or \$60, or they could afford to pay \$100 an acre for irrigation!

The idea of cheap irrigation was derived from the fact that at first in the arid region individuals and communities of farmers selected the easy places. By united labour, they built small canals leading from the rivers, constructed temporary wooden headgates, and took out water to the land whenever it could be had at relatively small cost. As a matter of fact, few of these people know what the works did cost. They put in all of their time and kept no record of it, labouring often far into the night. If they had paid for this work on an 8-hour basis, the cost would have astonished them. Having built the works themselves, and operating them in their own way, they were willing to submit to inconveniences and loss of water at critical times, which would have caused bitter complaint if the works had been built by a corporation. It is no uncommon matter to observe an almost complete loss of crop under one of these small canals, and yet one which the owners of the canal regard as an unavoidable calamity, concerning which it is useless to say anything.

Not only is the first cost of these early canals not known, but the acreage actually watered by them is exaggerated. In an actual case, it is claimed that over 15,000 acres are irrigated by one of these small canals. As a matter of fact, although the main line of the canal embraces a tract of nearly that size, it has never carried water for more than 1,200 to 1,500 acres. If a careful survey should be made of the lands actually irrigated, and all of the high spots, seeped areas, alkali, etc., eliminated, it is probable that the actual irrigable area within this tract said to include over 15,000 acres, would probably not be much more than 3,000. To enlarge the canal and extend the laterals to reach this 3,000 would require double the

expense already incurred; thus the stated low cost per acre of less than \$10, when compared with the land actually irrigated, would bring the real cost per acre up to nearly \$100 per acre.

FERTILISERS AND CULTIVATION.—Another fallacy commonly held ten years ago is that irrigated land required no fertiliser; that all that is required is to apply plenty of water, and the "desert will blossom as the rose." This is literally true that the desert will blossom, but what is needed are not blossoms, but fruit and forage; and these cannot be had in profitable quantities until the soil has been subdued and rendered capable of producing valuable crops through the addition of fertilisers, especially those containing nitrates. In some cases potash is needed, but, as a rule, there is an excess of the sodium and alkaline salts which, under careless irrigation, are apt to accumulate and ruin the land.

The first duty of the farmer on these raw lands is to level them off as accurately as possible, in order to economise in the future in labour and in amount of water in irrigating. Then a blanket of alfalfa, or some clover or leguminous plant, should be spread over the surface, and later plowed under. It is usual to cut a few crops of alfalfa, then plow it under, and after two or three years of careful handling in this way the soil may be brought nearly to its maximum fertility. To maintain it, or to increase the fertility, continual care must be bestowed upon it, and from time to time necessary fertilisers should be intelligently applied.

Especial attention must be paid to the chemical composition of any fertiliser and the relation of this to the existing salts in the soil. The arid lands are charged with certain chemicals which are in excess of actual plant needs, and if, through ignorance, an additional amount is applied, such as might be useful in the humid regions, the soil will be injured.

On the other hand, the soils of the arid region are frequently such that they require the application of chemicals which might be injurious to eastern soils. Too much emphasis can hardly be placed on this condition, as the farmer who has been accustomed to use a certain brand of fertiliser, and has implicit confidence in it, may use it to his detriment in a new country.

Irrigation for success must be accompanied by thorough cultivation. Another early fallacy, and one which still persists, is that the application of water can take the place of hard work on the farm. The water must be guided, and the quantity limited, and when the fields have been watered, many of the crops must be carefully and continuously cultivated as soon as the ground is sufficiently dry to permit this.

The largest crop returns are obtained from the lands where the least amount of water is applied consistent with plant development, and where careful cultivation is accompanied by the intelligent use of fertilisers. With different amounts of water used, the average value per acre increases rapidly to a point where a certain needed amount of water is applied at the right time, and then drops off rapidly as more and more water is poured on.

DRAINAGE AND ALKALI.—Among the conditions which were not fully understood ten years ago, are those connected with drainage. It was generally assumed that for successful irrigation it was merely necessary to bring the water to the land and let the farmer apply it, the soil and plants taking it up. In earlier times, when the irrigated fields were considerably smaller in area, and in long narrow lines bordering a stream, the questions of excess water and of drainage did not arise, because if there was any excess, it quickly found its way back into the stream. Thus there arose the widespread but oftentimes fallacious idea that in irrigated areas a large part of the water did return to the stream to be used over again. When the irrigated areas, however, were developed in large compact tracts, away from well-defined drainage lines, there came about another condition whose seriousness has only recently been appreciated. A considerable portion of the irrigated lands are being ruined where the excess water is not being disposed of. It is now no uncommon condition to find 10 or even 20 per cent. of the best agricultural area under a large system destroyed by swamps and patches of alkali. This waste water or seepage occurs in a variety of ways. It may percolate from the bottom and sides of the canals, gradually filling up the underlying soil until moisture appears on the surface. More generally, it arises from over-irrigation of the surface by the application of an excess of water.

Usually, the lands affected are those which originally were considered the most valuable, lying where they have received through centuries the deposits of rich soil washed from the hills. Water percolating, often for miles, from the uplands gradually appears on the surface as a damp spot; evaporating, it deposits a thin crust of earthy salts or alkali, and then gradually, and with increasing volume of percolation, the fertile field turns into a swamp. To maintain the irrigability and cultivability of the soil under these conditions, it is necessary to resort to drainage.

Although drainage is not specifically authorised by the Reclamation Act, yet it has been decided that it is involved as a necessary consequence of the intent of the Act. In building the newer irrigation systems, drains are being provided as the need for them develops, as an essential part of the projects. It is not possible always to anticipate, as in the case of building open canals, just where such drains should be located. The underground conditions cannot be known in advance with any degree of certainty, as different soils and combinations of soils and sub-soils behave in ways entirely different from those anticipated. For this reason while some main line drains may be planned and built with reasonable certainty, the great body of the work must be left until it is shewn by actual experience just where and of what dimensions and character the drains should be built.

MARKETS.—Another factor that has in some measure affected the successful question of irrigated lands has been the change in the market value of certain products of these lands. With the increase in size of the areas under cultivation, and the resultant increase in production, there has resulted a corresponding decrease in the selling price of the commodities produced, and often a material reduction of anticipated profits. This has caused some temporary hardships to the farmers, but as it has necessitated more careful and economical operation, it has not been an entirely unmitigated evil.

Notes on Bee-Keeping.

By FREDERICK SWORDER.

Before leaving the subject of handling frames in this warm climate, one or two important points should not be lost sight of. After having withdrawn a frame of comb from a hive, with the object of dislodging bees therefrom, it is a good plan to grasp the frame firmly at one end of the top bar with the left hand, holding it a few inches above the opened hive; then, with the right fist give the left hand a sharp downward blow. This sudden surprise to the bees is irresistible, and contrary to expectations. No fear of viciousness need be anticipated, for it has the effect of thoroughly subduing the bees, all of which will drop off the comb and clear away among the remaining frames.

If on this frame a sealed queen cell is seen, and it is wished to preserve it, this rough treatment must not be adopted, for the delicately-developing inmate would be permanently injured, thereby failing to mature. In a case of this kind where it becomes necessary to remove bees, they may be gently brushed off downwards with a wing or a bunch of feathers.

When a frame of comb has been lifted out of a hive the experienced apiarist has no trouble in seeing the contents on that side opposite to him; but with a novice, there usually arises a difficulty in examining the other side, especially if he is hunting for a queen.

Whether the frame which is being handled contains an old comb or new, wired (which is advisable) or unwired, make it a rule to turn it thus: hold the frame by its shoulders with the thumbs and index fingers, raise the left hand, by gently giving the frame a half turn, like a swinging gate, so that the top bar is pointing upwards, and then by lowering the left hand, the opposite side of the comb, although upside down, is clearly

visible. This procedure, if followed, is easily accomplished and safe, for the comb has not been held in a horizontal position, and consequently no untoward strain has been put upon it to cause it to break away from its frame. By reversing these movements the frame of comb will be safely brought back to its normal position.

From whatever standpoint one may look at the work of the honey bees, whether as architects or engineers, one cannot but be filled with wonder and admiration, for as comb-builders: their capabilities far exceed our conception.

Let us examine or follow up the progress of a swarm which has taken possession of a new abode.

Previous to departure from the old home, a liberal quantity of honey has been consumed by the emigrants, and this feast of sweets, in conjunction with close clustering in the new home, induces warmth. After hanging with perfect stillness for about 24 hours, a temperature of over 95 deg. Fahr. being maintained, minute white pellets, in the form of wax, exude from the eight plates found on the under portion of these worker bees. During this process of wax-formation very few bees leave, for all are wanted at home to produce materials for constructional work, in order that the queen may commence laying; for egg-production will take place even before many cells are complete.

Instinct appears to decide which bees are to remain at the old locality and which are to depart for the new home, and it seems a wise provision of nature that some young bees should accompany the swarm, for these are specially wanted to act as nurse bees to the maturing larvæ, whereas the older bees are incapable of supplying this nitrogenous food. This incapacity is due to the gradual disappearance of their salivary glands, owing to advancing age.

Previous to constructional work, man calculates the strains to be set up, and then commences his building at the bottom, everything added to the structure resting on this foundation. But bees, on their part, instinctively start their wonderful comb-building from the topmost point, provided there is something to which they can cling, working with precision downwards, everything being in suspension.

Time, patience and united effort on the part of these worker bees, which may number from 2,000 to over 25,000, mean progress, and as the work advances more bees are able to leave their new home for fresh supplies, for to a great extent the food contained in their honey sacs has, ere this, been used up for bodily sustenance and wax production.

The majority of the old bees which accompanied the swarm will never live to witness the completion of the new structure, their span of life being limited to not more than three months. The queen and her progeny will alone share that privilege.

The production of wax devolves solely on worker bees, and by an extraordinary manipulation of their legs and feet this product is transferred to the mouth, where it is mixed with saliva. While in this pliable condition, assisted also by the temperature of the clustering bees, the cell walls are built as thin as the 1-180th part of an inch, and, so far as can be perceived, this delicate work is accomplished in the dark.

The honeycomb, while of the greatest capacity and strength, and constructed with the least expenditure of time, material and labour, can suspend quite thirty times its own weight. For instance, with a completed 1 lb. section it will be found that half an ounce of comb is capable of carrying 16 ounces of honey.

It may be of interest to mention that a good queen in her prime, during a good honey flow, is quite equal to the task of laying over 3,000 eggs every 24 hours, and that during her lifetime, extending to over three years, she may lay over one million eggs, each one in diameter less than an ordinary pin, and barely $\frac{1}{16}$ th of an inch in length. These, if placed end to end, would reach a mile and three-quarters.

By assisting bees, the better return will they give. Let it be borne in mind that a few shillings spent in the purchase of comb-foundation is money well laid out, for where this material is fitted into frames and wired, the colony being then in readiness to gather the precious nectar will build up much quicker. Again, if comb-foundation is provided for the industrious workers, a far less quantity of honey is needed by them to produce these thousands of cells.

It is absolute folly to purchase a movable frame-hive without previously fitting the frames with comb-foundation. Although the bees will readily build combs on the empty frames, they will be at such angles and in such manner as to fasten all the frames together, thus defeating the object in view. The main feature of the movable frame is to have the comb built as straight as possible, thereby ensuring easy manipulation.

Previous to the invention of the frame-hive and comb foundation, bees were simply placed in a box and permitted to build combs as seemed most fitting to themselves (this unsatisfactory state of affairs still exists), resulting in crooked combs, while the inmates could not be satisfactorily examined.

In order to obviate these difficulties, and also to enable the bee-keeper to exercise complete control over his work, it became necessary that some means should be devised compelling the bees to build straight or flat-sided combs, these, to hang as in nature, equidistant and parallel, yet each within its own frame. This also minimises the extravagant consumption of honey required for conversion into wax for comb-building.

In order to produce 1 lb. of wax it is not possible to gauge exactly the amount of honey consumed, but generally speaking it may be taken that from 10 lbs. to 16 lbs. is necessary. It will thus be seen that there is much time lost and a severe strain put upon the whole colony, important opportunities which might be more profitably utilised.

(To be continued.)

Termites or "White Ants."

By RUPERT W. JACK, F.E.S., Government Entomologist.

The termites, or "white ants," thrive throughout the greater portion of the warmer belt of the earth, but it is in Africa that their development has reached its highest point, and that their destructive habits appear to impose the heaviest tax on the resources and energy of mankind. The builder, the engineer and the farmer in Africa must all take into account the wood devouring habits of the little insects, which abound almost everywhere beneath the soil of the greater portion of the continent. Iron must be substituted for wood, wood treated with special preparations, zinc "courses" built into walls, measures taken to prevent the insects building up under floors, the nests destroyed in ground prepared for plantations, and tax paid in other ways to the termites. If we consider the money spent in preventive measures, and the money lost through their depredations, the annual loss through termites in South Africa must reach a very considerable figure.

Our knowledge of the life history and social economy of the termites is very fragmentary. It apparently differs somewhat in the different species. A bare outline of the main features of their lives is all that can be attempted.

First of all, it may be mentioned that entomologists take exception to the use of the term "white ants" for these insects. The termites resemble the ants in that they are small and usually wingless insects, living in communities in the soil, in that the individuals of the community are differentiated in form for the performance of certain duties, and in that they produce at times large numbers of winged males and females which leave the nest. Otherwise there is little in common between them and the true ants. It would probably not

impress the general reader to state that the two kinds of insects belong to entirely different orders, but, beyond the obvious difference in form that may be observed by anyone, the following fundamental distinctions may be noticed. The young of the ants are hatched from the eggs as helpless maggots, differing from the adults as a caterpillar differs from a butterfly. These maggots feed up and enter into a quiescent state like a caterpillar before reaching the adult state. The young termites, however, differ from the adult no more than a "voetganger" does from an adult locust; indeed, not so much, as the bulk of adult termites never develop wings. Again, the workers and soldiers of the ants are imperfectly developed females, like the worker bees, but these castes in the termites are made up of both males and females, imperfectly developed or specially modified for their work. Further, the males of ants are produced in large numbers for the single purpose that one of them may fertilise a queen. They all quickly die. In the termite community, the male remains by the side of the queen, and is tended by the other inmates of the nest. One act does not end his career of usefulness. There are other points of difference, but sufficient has been mentioned to illustrate this point. The fact is the so-called "white ants" bear no closer relationship to the true ants than a cockroach does to a honey bee.

In most termite communities there are quite a number of different forms of individuals to be found. The chief forms consist of the king and queen, complementary royalties, soldiers, workers, and the immature forms of each, as well as those of the winged males and females which are present at certain times in enormous numbers. In some species there is no specialised worker caste, the soldiers and the immature individuals doing the labour of the nest. As a rule, however, the workers are very numerous.

The king and queen are concerned wholly in reproduction, and in many species are quite helpless in other respects, needing to be fed and tended by their subjects. Often they are enclosed in an earthen cell in which the queen at least is a hopeless prisoner, a mere egg-producing machine. The queen termite as she develops in her earthen cell has not her equal in nature. The rate of egg production of one species (*Termes*

bellicosus) was estimated by Smeathman to be 60 to the minute, or over 80,000 per diem. As termite queens are supposed to live for several years, even suppose the above rate was kept up for only a few months in the year, the progeny of a single female would have to be reckoned in millions. However this may be, the termite queen is the most prolific of insects.

The complementary royalties are certain individuals kept in an advanced state of development to take the place of the reigning royal pair in case of accident, or in very large communities they may possibly supplement the egg-laying labours of the queen. It is owing to the presence of these complementary royalties that the practice of digging out and killing the queen, which is regarded by many as an effective method of destroying a termite nest, usually fails in its object.

The soldiers may be recognised by their greatly developed heads. The division of labour between them and the workers is not very clearly defined. In many species the workers are stated to be better fighters than the soldiers, and, as a matter of fact, the jaws of the soldiers in some species are modified in a way difficult to account for on the basis of utility, as they seem fitted for neither work nor fighting. In some of the larger mound-building species, however, the soldiers are undoubtedly very ferocious, and their strong curved and pointed mandibles are well fitted to defend the nest. The soldiers are said as a rule to take part in the ordinary labours of mound-building, etc.

The winged individuals are perfect males and females capable of starting a new colony and produced for this purpose. Owing, however, to the efforts of their enemies, it is probably an exceedingly rare event for them to succeed in this purpose. They are provided with two pairs of wings which serve for one flight only, and that a weak and fluttering one. A still evening after the first rains of the season have fallen is a favourite occasion for these flights. The winged individuals come tumbling up out of the chimney of the nest in a desperate hurry to get into the air away from the enemies that are sure to be awaiting them on the ground. The workers and other individuals often seem to form a guard about the opening whilst the winged contingent escapes. This guard, however, is with the

smaller species often pitifully ineffective. The larger predatory true ants, which nearly always attend a termite flight in force, walk into the midst of the guard without hesitation and carry off the soldiers, workers or winged termites as fast as they can catch hold of them. The winged army, however, pouring from the hole is not to be stayed, and soon the air is full of fluttering forms, frequently so numerous as to resemble a snowstorm. Even in the air, however, they are not free from their enemies, as birds, dragonflies, etc., snap them up eagerly. In some species at least the male joins the female in the air. Alighting from their flight they snap off their wings close to the body. The female, closely followed by the male, hurries off to seek shelter. If the pair survives they start a colony which seems to grow very slowly at first. The chances are, however, enormously in favour of their being devoured. The enemies of termites comprise ants and other predaceous insects, birds, lizards, toads, antbears and other insectivorous animals, but although they destroy the flying swarms to such an extent that some observers are of the opinion that not one pair in a million survive to found a new colony, they make but little impression on the general numbers of the termites. Without doubt they keep them from overrunning the continent to an extent that would render it uninhabitable to other living creatures, a state of affairs that would quickly be attained were it not for these checks on increase.

The nests of termites vary greatly, some constructing enormous mounds as much as twenty feet in height, whilst others do not betray their presence by disturbing the surface of the ground to any extent. Many and strange also are the different erections made by the mound-building species, but this is not the place for descriptions of these interesting homes, many of which are doubtless familiar enough to the reader. The internal arrangements of the nests differ as much as the external structure, and the sectioning of a termite heap is always an interesting operation. The layman, in digging out a mound, is often puzzled by unearthing curious sponge-like structures on which little round white knobs are to be seen. These structures are inhabited by small, soft, helpless, white termites. The sponge-like structure forms the nursery of the young termites, and on it is cultivated a white fungus—the

white knobs already mentioned—which serves as food for the young. All species do not cultivate these fungus gardens, but they are commonly found in nests of mound builders in Southern Rhodesia.

There is a species of termite to which the name *lucifugus*, or "light shunning," has been given. The name could be equally well applied to the whole family with a few exceptions. Most termites are quite blind and shun the light to a remarkable extent. Whether this is from fear of enemies or on account of the drying effect of the sun being injurious, it is hard to say. The fact remains that they construct covered galleries wherever they go, and carry on their destructive work in darkness. The exceptions to this rule include the so-called harvesting or marching termites, known to the Dutch as "hout kappers." These termites are conspicuous on account of their habit of cutting off grass and twigs into short lengths and carrying them to their holes. They possess eyes and work in the open.

The injuries due to termites may be divided under three heads:—(1) Injury to dead wood, (2) injury to living trees, (3) injury to stacked and standing crops.

Injury to Dead Wood—Preventive Measures.—Mr. C. B. Simpson, formerly entomologist to the Transvaal, commenced a very useful series of experiments in treating timber with various substances to protect it from termite attack, and since his death the observations have been continued by his successors. A great variety of preparations have been tested, and it has been found that the only preparations that can be relied upon to prevent attack are those containing a considerable quantity of soluble arsenic. Pieces of ordinary deal, lemon-wood and gum, soaked for twenty-four hours in such liquids, resisted termite attack for a period of three years, and amongst the numerous other preparations tested the only pieces that resisted attack for this time were those which had received two good coats of hot coal tar, or had been soaked in a saturated solution of copper sulphate (an expensive treatment). In connection with coal tar, however, it must be remembered that the tests were made with absorbent wood, and that the pieces treated were small and of solid rectangular form, so that it was

possible to make the coating very thorough. Coal tar in many woods has little penetrating power, and if a very slight opening is left anywhere to give the termites entrance, the tar coating will have little or no effect in keeping the wood from being entirely hollowed out. If dry wood is immersed in liquid, thoroughness of treatment is assured, and the penetration is considerable. The use of coal tar alone is therefore not considered to ensure safety.

The arsenical preparations that successfully preserved the wood from attack were as follows, the list being taken from notes in the "Transvaal Agricultural Journals" for October, 1907; April, 1909; and October, 1909:—(1) Arsenite of soda, 10 per cent. solution (*i.e.*, 1 lb. to each gallon of water); (2) Atlas preservative, full strength; (3) Atlas preservative, 10 per cent. solution; (4) Demuth's dip, 10 per cent. solution; (5) Cooper's dip, 1 pint to 9 gallons water; (6) Alderson's cattle dip, 4 lbs. to 8 gallons water. The pieces of wood tested with the above were either simply soaked for 24 hours, or soaked for 24 hours and then boiled. In addition, tests were made with Atlas preservative by giving the wood one and two coats with a brush. At the end of three years it was found that none of the pieces treated with the above had been eaten by the termites.

Preparations that were tested and failed to preserve the wood from attack for three years included:—Street's white ant cure, coal tar (one coat), Stockholm tar, creosote, solignum, asphenite, crude carbolic acid, Jeyes' fluid, carbolineum, various tobacco extracts, various paints, oils, soaps, etc. Copper sulphate protected for three years two pieces that were soaked in a saturated solution of this chemical for 24 hours, but weaker solutions failed.

There is no doubt that a preparation that only calls for application with a brush has advantages over one that needs to be placed in a receptacle big enough to hold the timber to be treated. It would pay the timber merchant to set up a plant to render the timber proof against "white ants," but in the case of whole lengths of timber needing treatment, the need for this receptacle places this method above the reach of the average builder or carpenter, and especially above that of the

farm carpenter, though use may be made of a cattle dip to treat large quantities of timber. Ends of timber for insertion into the ground can, however, conveniently be soaked in a barrel or drum, and in this way straining posts for fences, ends of timber used in the erection of out-houses, etc., can be treated. The cheapest preparation is the arsenite of soda solution, and, as suggested by Mr. C. W. Howard, Mr. Simpson's successor in the Transvaal, a thorough soaking with this solution, followed by a thorough coating of coal tar, should prove a very lasting treatment, as the coal tar would protect the soluble arsenic being washed out of the wood by water in the soil.

It must, of course, be borne in mind that any preparation used only protects the actual material that is soaked with it. If the protective layer on the outside is complete, the termites cannot reach the edible wood within. If a mortice or other joint is cut in treated wood, the impervious layer is usually penetrated. All forms of joints should therefore be dressed after the last cut has been made, and care taken to stop up also any holes that may be left by the removal of a nail or screw or bolt, or through a mistake in the use of a gimlet, etc. A very small hole may result in the ruin of a piece of timber.

In the Transvaal experiments, pieces of different kinds of native and imported timber were included in order to determine what species, if any, were naturally resistant to termite attack. The following species alone were untouched at the end of three years:—(1) Leadwood (*Combretum porphyrolepis*); (2) black ironwood (*Olea laurifolia*). Vaalbosch (*Brachylaena discolor*) was untouched at the end of two years, but by the end of the third year two out of the three pieces tested were eaten to some extent.

Our experience in Southern Rhodesia is that the wood of the Mopani tree (*Copaifera mopani*) withstands termite attack for years, and is therefore very suitable for straining posts for fences, though unfortunately not a timber that can be cut and squared.

Injury to Dead Wood—Remedial Measures.—Applications are sometimes received at this office for information as to the methods to be employed to get rid of termites that have

found their way into the timbers of a building. This, as may be imagined, is not a very easy undertaking, and it is also not very easy to give general advice that will be applicable to all cases. Common sense will, however, generally point a way by which difficulties may be overcome, and the knowledge we have, as to the means by which termites may be repelled and destroyed, applied to special cases.

All brick buildings on land where termites occur ought to be built with a metal "course"—No. 10 sheet zinc is generally used for this purpose. The "course" consists of strips of metal built into the wall, usually a few inches above the level of the ground, and running through all the walls at this level so as to form a barrier against the penetration of the insects. The strips project an inch or two on either side of the bricks. If this is not done, and no other measures are taken, the insects are always liable to find their way through the bricks to the timbers, since, owing to the cost of cement in this country, the bricks are usually bound together with a mixture of clay and mortar, easily penetrated by termites. Probably by dissolving arsenite of soda in the water used to make the mortar or "dagga," the walls would be protected against termites, but the writer is not aware of this method having been employed. There are, of course, certain objections to using so poisonous a substance in work that is performed by uneducated natives, but whether these are sufficient to necessitate the abandonment of an effective protective measure is difficult to judge. If a building provided with a "zinc ant course" becomes infested with termites, it may be due to one of the following facts:— (1) The "course" may be imperfect; (2) the termites may have built up under the floor, and so gained access to the timbers; (3) the "course" may have been omitted from the supports beneath the beams of the floor, or from the brickwork supporting the hearth; (4) a piece of wood leaning against the building may have formed a bridge for the insects to get into the brickwork above the "course"; (5) an earth-filled verandah may have afforded entry to the walls above the "course."

In any case, our main endeavour must be to locate the nest, and this is sometimes a comparatively easy matter, as in the case of a mound having been built up under the floor, or very difficult, as in the case of invasion by a species that does

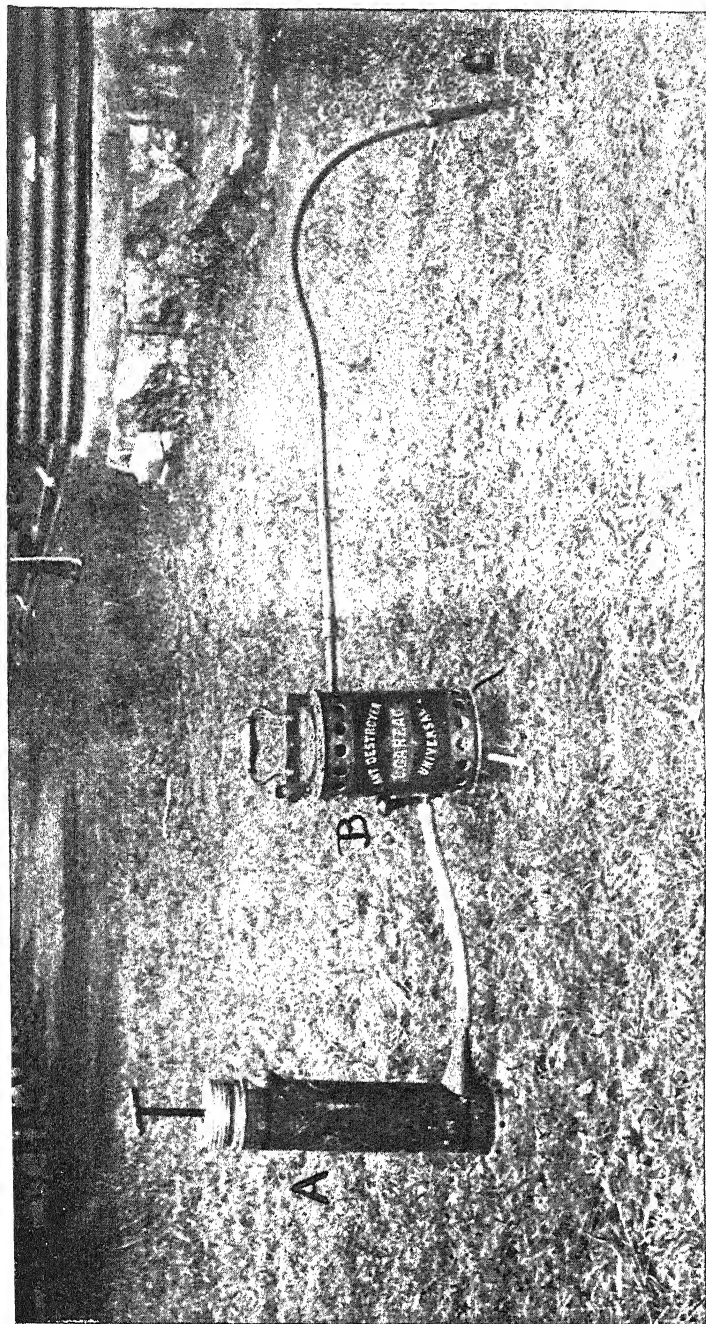
not build a mound from outside. First of all, it is necessary to remove the damaged timbers, even although this entail some damage to the brickwork. The tunnels in the brickwork can then be located, supposing that no external galleries have been constructed along the walls. Into these tunnels fumes of white arsenic and sulphur should be pumped, by means of a machine specially constructed for the destruction of "white ants" and true ants. This machine is shewn on the plate. Cases have been reported in which this was found to be sufficient to check the attack, but generally more radical measures are needed. The white fumes of the powder issuing from different openings may indicate the direction of the galleries leading to the nest, and by following the line up, by inserting the nozzle in a fresh point, the nest may be located. The matter is not always as simple as this, however, but no fixed rule can be given that will meet all cases. The worker must use his own ingenuity in locating the nest. Once located, the nest is to be destroyed by means of the machine, the exact method of use being described later. Once the nest has been destroyed in a building, care must, of course, be taken to stop the path by which entrance was gained, otherwise the trouble is likely to be repeated later. Some houses, built on ground known to be infested with "white ants," are built on specially high foundations, and furnished with means of access to the timbers beneath the ground floors. This is a good plan, especially if the portion beneath the floor is made well ventilated and as light as possible. Houses not built with a view to excluding termites are not common in Rhodesia, but when this is the case, the house is always liable to be re-attacked. The best procedure in these cases is to replace the injured timbers with wood treated with one of the effective preparations already mentioned, to poison the galleries in the walls with fumes from the ant machine, and to locate and destroy as many termite nests in the vicinity as possible.

Mr. C. B. Simpson gives the following description of a treatment to protect buildings from termite attack, due to Mr. J. Hancock, of the Public Works Department, Transvaal:— "Place a layer of coal ashes 4 to 6 inches deep on the base on which the building is to be erected, and for about 6 inches beyond. Then smear this layer with a coating of tar and sand in the proportion of 1 to 10, this forming a kind of tar mortar,

the tar and sand being thoroughly incorporated by heating and mixing." The cost is given at about 1s. per square yard, but would doubtless be greater in Rhodesia. The provision of the "course" in the walls is, however, effective if properly constructed.

Injury to Living Trees.—The damage caused to living trees by termites is the subject of far more enquiries at the office than the damage suffered by timber. The constant demand is for some application to apply to the soil to keep the pests away from the trees, and this is just the point where our knowledge is inadequate. It may be said at once that no preparation is known at present which may be safely applied to the soil about the roots of trees and which will suffice to discourage the "white ants" for more than a very limited period. In Natal, Mr. Claude Fuller, the Government Entomologist, has paid a very great deal of attention to "white ants" and their injuries, and, as the result of his experience, he is not prepared to recommend the use of any liquid application to the soil as a deterrent to "white ant" attack, except as a most temporary measure, the preparations requiring to be renewed so frequently that the expense of securing the permanent safety of trees in this way is altogether prohibitive. Solutions which are supposed to keep termites away from trees for a short time and which are not injurious to the trees themselves are:—Copper sulphate, 1 lb. in 50 gallons water; weak solutions of Jeyes' fluid or carbolic acid, tobacco water, tar water, soap solution, etc. Placing tobacco dust round the trees is another temporary expedient. These preparations may be of use to an amateur gardener with a few trees to protect, but not to the commercial planter.

In connection with the habit which certain species of termites have of ring-barking fruit trees just above the ground level, a series of experiments was carried out at Salisbury and Mazoe, with a view to finding a preparation which could be safely used to band fruit trees from the crown to some 8 inches above ground level, and would deter termites from attack. Of all the preparations, coal tar appeared the most promising, because it is well known to be distasteful to termites, is moderate in price, and is not affected by water. Apple and orange trees on which the band, applied directly to the bark, has been



Universal Ant Destroyer.

B.—Brazier or Furnace.

C.—Nozzle.

A.—Air Pump.

renewed each year, have grown and thriven and shewn no tendency to fall behind untreated specimens during a period of three years. Unfortunately all species of termites do not have similar habits, and though the tar band apparently protected the orange trees at Mazoe, the experimental apple trees at Salisbury were attacked and killed from the roots by a different species. The treatment is not therefore an effective protection against all tree-destroying species. In connection with orange trees, it may be mentioned that Fuller in Natal considers this tree practically exempt from attack, except under circumstances in which the termites are absolutely starved into attacking it. That one species of termite in Southern Rhodesia has no objection to the tree is indicated by the fact that, at the extensive citrus plantations at Mazoe ever since the trees, many of which are three years old, have been planted, constant attention has been necessary both in the nursery and in the orchard to protect the trees from injury. The attention takes the form of breaking down the covered galleries which are built up the trees. The injury consists of the formation of very narrow furrows which have a tendency to completely girdle and kill the trees. Attack at the roots has not been noticed. Against species of this habit a tar band would doubtless prove effective, and as root attack on orange trees has not been noticed, it may be that this method has a sphere of usefulness in connection with these trees.

In general, however, to protect orchards and plantations from attack, relentless warfare must be waged against the termite communities in the soil, and to prosecute the war the Universal Ant Destroyer* is the best weapon available. It is somewhat unusual for entomologists to recommend a proprietary article in the same way as this machine is recommended in South Africa, but the fact of the matter is that the machine embodies exactly what is needed to destroy termites and ants, namely, the means of generating a poisonous gas and the means of forcing it into the many ramifications of the nest. When a nest is located, the fire having been lighted in the brazier, all that needs to be done is to open up one of the larger galleries, care being taken to ascertain that it is in use at the time, and not an old "disused drive," to insert the nozzle,

* This machine is procurable in Southern Rhodesian towns for about 75s.

plugging it into place with a lump of wet earth, to throw a tablespoonful of the powder on the top of the glowing charcoal, to shut the brazier and to commence pumping. All apertures through which fumes are seen to escape are to be closed, and pumping kept up afterwards for from five to ten minutes. Of the fuels available in Southern Rhodesia, charcoal is the best, but dried cow dung may be used as a substitute should other fuel be absolutely wanting. The fuel should always be pumped to a white heat before the powder is added, in order that the fumes may not cool too rapidly in entering the galleries. Care should be taken not to put in more than a tablespoonful of the powder at a time, so that the fumes may be produced rapidly and evenly.

In connection with the opening of the nest, in the Transvaal it is recommended not to commence operations from the top of a mound, but to make a hole about two feet from the base of the mound at the side, driving it in an oblique direction towards the centre of the mound. Fuller is insistent on the value of using the exit holes of the winged swarms whilst they are actually emerging. He states that at this time these specially constructed chimneys are in communication with all the ramifications of the nest. This passage is closed by the termites after use, so that prompt action is necessary. It is no use marking the spot with the intention of dealing with the matter next morning.

The machine may also be used to trace a small gallery from an injured tree to the nest. The procedure is to insert the nozzle, brought to a smaller point by the use of a removable metal funnel, into the gallery, to pump gently and watch where the fumes emerge. The machine is then shifted to the new spot, and the procedure repeated, and so on until the nest is reached. In capable and intelligent hands the machine is a very effective weapon against termites, and one planter in Natal has reported that by the constant use of several machines he has made termites a negligible quantity over 6,000 acres (Fuller, "S. A. Union Journal of Agriculture," June, 1912).

Carbon bi-sulphide has enjoyed a term of usefulness in the destruction of termite nests, but, apart from its costliness, the price being 15s. per gallon in Salisbury, it falls short of the machine, in that the fumes are not pumped in with force, that

the fumes are invisible, and do not betray the presence of outlets, that it only kills the termites overcome by the fumes, whereas the fumes of arsenic cause the death of those that eat the dead individuals—the usual method of getting rid of corpses—and that it does not permanently poison the nest and render it uninhabitable by a new colony, though whether this is a common event has not been decided. The procedure with carbon bi-sulphide is to open the nest and pour in the liquid. Simpson recommends two to four ounces per heap. The chemical is poisonous and highly volatile, and, when the gas is mixed in certain proportions with air, highly explosive. Its use therefore calls for care.

Poisoned bait is another remedy which has its advocates. The formula as used for cutworms is generally adopted, and consists of 1 lb. of an arsenical compound, 8 lbs. of treacle or black sugar, and 10 gallons of water. This poison is used to moisten maize meal, bran, chaff, packing, etc. Arsenite of soda is the cheapest compound of arsenic, but, being soluble in water, can only be used away from plants, and, for prolonged effect, in a sheltered position; firstly, because it is injurious to vegetation, and, secondly, because it washes out readily. Paris green can be used when it is desired to place the bait round trees. For this purpose a ring of the bait should be made some distance (2 ft.) from the trunk. The efficacy of poisoned bait in destroying nests when placed round trees appears somewhat doubtful. The idea is that the foraging termites eat the poison and return to die in the nest, where they are devoured by their fellows, who also die, and so on. If the bait is too strong, it is likely that the foragers may die before reaching the nest, and therefore a weaker bait may prove more effective. In the case of poisoned bait for destroying the Argentine ant in California, it was found necessary to adjust the strength of the bait so that the foragers could get back to the nest and feed the queen with poison. The destruction of a few thousand worker ants had little effect on the numbers of the community, owing to the fecundity of the queen. How much more is this likely to be the case with termites of which the queen is far more fertile than the Argentine ant queen! Also, from the immunity from attack enjoyed by wood soaked in arsenite of soda, it appears that the workers, etc., of termites soon learn to leave poisoned

material alone, and the sudden death of a few hundreds of foragers might well result in warning the remainder. Of course, there is this difference in habit between termites and true ants, that the latter do not, as a rule, devour the corpses of dead relatives, but carry them out of the nest. Sick termite individuals which just reach the nest would be likely to spread destruction, as would not be the case with true ants. It is difficult, however, to imagine a community of perhaps millions being poisoned by the quantity of arsenic carried back by a few foragers. In any case, further information on the subject is desirable. The insertion of a quantity of poisoned meal into the opened nest, however, would appear a promising proceeding, and has been frequently recommended, though the writer is not aware of its having been much adopted in South Africa.

In connection with termite attack on fruit trees, no doubt constant cultivation has a deterrent effect on some species of termites, but it cannot be relied upon to protect the trees. The orchards at Mazoe are grown under dry farming conditions, cultivators being kept at work almost constantly during the dry weather, and yet the pests are very troublesome.

With regard to the trees most susceptible to attack, plum, apple, apricot and fig suffer readily, and in Southern Rhodesia at least citrus trees are by no means exempt. Peach trees, if healthy, are stated to be safe from attack in Natal, but there is a healthy seedling peach on the writer's plot at Salisbury which is being attacked readily enough, although upwards of five years old. The attack is on the stem and not on the roots. Peaches, however, are little grown on a commercial scale in this territory, and opportunity for observations as to whether they are more resistant than other trees to our species of termites has been lacking.

Injury to Standing or Stacked Crops.—Injury to standing crops is generally the work of the "harvesting" or "marching termites," which differ from their relatives in the possession of functional eyes, and in carrying out their work in the open. They chop grass, etc., into short lengths, and carry it to the mouths of their holes where they leave it, going off for more. Towards evening they set to work and carry in the collected provender. They frequently do considerable damage to the

smaller cereals by chopping off the stalks, commonly clearing patches round the nests. They can be easily killed *whilst working* by inserting the funnel of the ant machine into the hole to which they are carrying the forage. It is useless to attempt this at any other time, as the passages are closed and impervious to the fumes.

In connection with injury to stacked crops, which often assumes serious dimensions in the case of stacks of hay and mealie hay, a Rhodesian farmer reports very good results from the formation of a layer of wood ash several inches deep on the ground to be used for the stack. The layer was formed by burning the wood on the spot, and whereas the previous year the bales were injured to a height of several feet, the stack built on the layer of ashes was quite free from attack, although a loose bale lying on the bare ground near by quickly attracted the pests.

In concluding this article, which is in truth little more than a compilation, the writer must acknowledge indebtedness to the pamphlet on termites by the late Mr. C. B. Simpson, published by the Transvaal Department of Agriculture, to subsequent notes in the "Transvaal Agricultural Journal," and to Mr. Claude Fuller's recent articles in the "Agricultural Journal" of the South African Union.

Malting Barley.

GOLDEN RULES FOR GROWERS.

Recently a set of "golden rules" for the cultivation of barley were issued by the experiment station for the brewing industry in Berlin, for the guidance of German farmers. These have been translated and published by the Board of Agriculture in England, and they should be of considerable interest to growers. The rules run as follows :—

1. Till the ground as early as condition of the soil will allow.

2. Use the best pure seed, free from smut.

3. If the seed is bought, or comes from a field that shews signs of smut, it should be treated with half per cent. solution of copper sulphate.

4. The drills should not be too far apart (6 to 8 inches). Do not spare the seed.

5. Avoid sowing clover with barley.

6. The Chevalier barleys are the best, but they require very careful cultivation and good soil, and are especially sensitive to strong nitrogenous manuring.

7. Imperial barleys, therefore, should be preferred where the soil is highly nitrogenous, or where, owing to unfavourable weather, the Chevalier and other sorts may be expected to suffer from "lodging" and damage to quality.

8. For dry soils the Hanna barleys are most suitable. These barleys also deserve consideration for better soils on account of their prolific yields.

9. Brewing barleys require rich and easily assimilated stores of plant food.

10. This is supplied by heavy manuring with potash salts and superphosphate. For light soils potash is specially important. Barley should be grown after hoed crops, not after leguminous plants.

11. Great care is necessary in applying nitrogen, because nitrogen makes the barley rich in albumen, and therefore of less value for brewing purposes. The manuring and production of the preceding crop must be taken into consideration. The application of farm-yard manure should be avoided.

12. The disadvantageous effect of nitrogen on the quality may be largely controlled, to the advantage of the total yield, by heavy manuring at the right time with potash and phosphoric acid, as well as by careful cultivation. The potash should be put on early, even in the autumn.

13. The soil should be so prepared that the spreading of the delicate roots of the barley may meet with little mechanical hindrance.

14. On all light soils the provision of moisture during growth must be secured by deep cultivation, working the soil in the autumn, by taking barley after hoed crops, by early seeding, harrowing, and destruction of weeds.

15. In clay soils an excess of water must be avoided by careful tillage, which keeps the soil in a favourable mechanical condition; a crust must not be allowed to form on the surface.

16. The barley must be fully ripe before being harvested.

17. If the barley is quite dry, it should be carried immediately it is cut.

18. If for any reason this cannot be done, the barley must be immediately tied into sheaves and put into stooks.

19. Care should be taken to avoid injury to the grain in threshing, as this decreases the value.

20. The greatest care should be taken in the preparation of the barley for sale, as the dressings, etc., are valueless to the brewer, but can be usefully used for fodder.

21. Barley of uniform quality should be offered for sale in as large lots as possible.

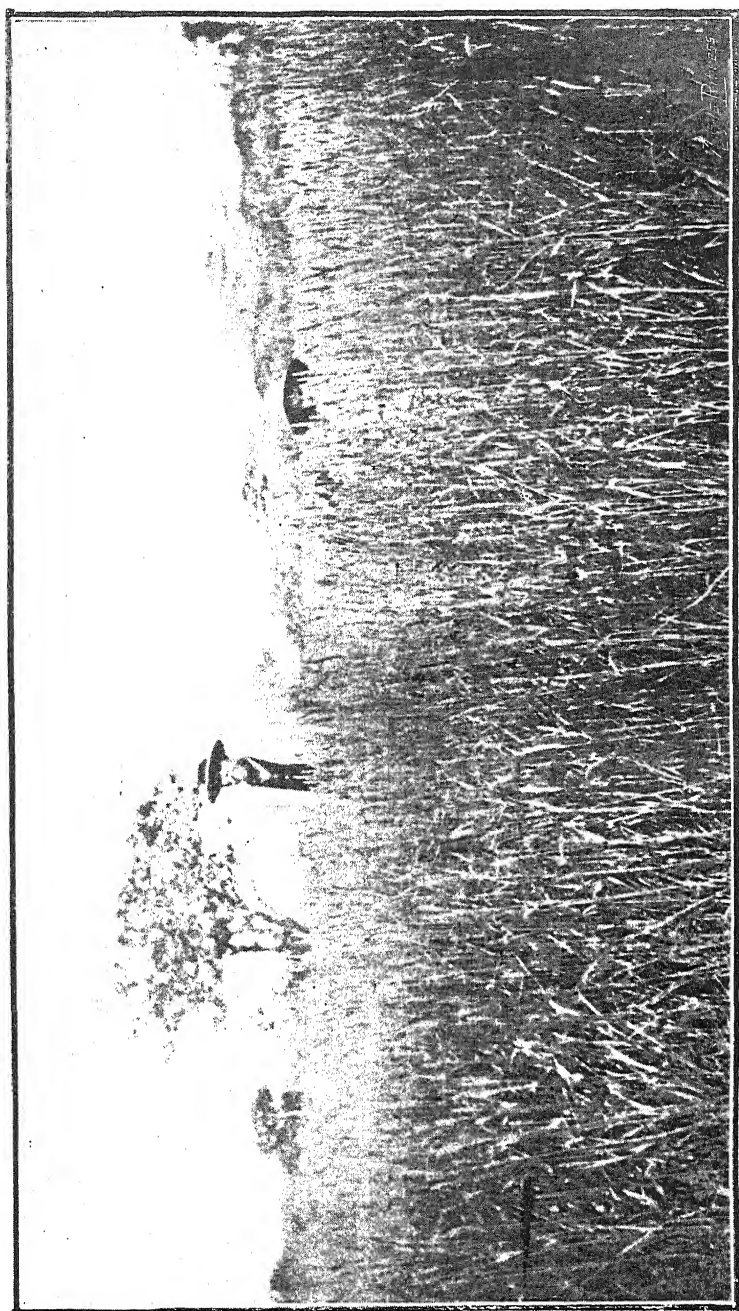
22. Agricultural associations can very greatly assist small farmers to grow barley profitably by buying seed in common, and by issuing advice as to methods of cultivation.

23. Damp barley must be protected from injury by drying, as if the grain germinates, it becomes useless for brewing.

Wheat in the Marandellas District.

On the opposite page we reproduce a photograph of a wheat crop grown in south Marandellas by Mr. F. C. Hefer on his farm Looé, and regarding which he gives the following information :—

The variety was Els wheat, and was sown under irrigation on a black sandy loam soil which had been lightly manured. Seed was sown broadcast at the rate of between 45 and 50 lbs. per acre on 14th June. The crop was ready for reaping by the end of October, and was cut the first week in November, giving a yield of rather more than 7 bags (1,400 lbs.) of clean seed per acre. The area under crop was only $2\frac{1}{4}$ acres, but this is sufficient to indicate what can be done in the way of wheat growing on the sandy soils of Rhodesia. It will, moreover, be of interest to our readers to learn that in Australia the great bulk of the wheat is grown on sandy soils not greatly dissimilar to those of Rhodesia. During the past winter many farmers have experienced difficulty in disposing of oat forage and are now turning their thoughts towards wheat growing. An experiment such as the one conducted by Mr. Hefer should be sufficient proof of the possibilities of wheat growing in Rhodesia in those localities where conditions are suitable.



Els Wheat on Mr. F. C. Hefer's Farm Looé, Marandellas.

Departmental Correspondence.

Under this heading we publish correspondence passing between farmers and the Technical Officers attached to the Department of Agriculture, containing points which may be of general interest and assistance to our readers.

SUMATRA TOBACCO.

A. T. writes : Can you give me advice on the following points in connection with the Sumatra leaf experiment :—

(1) Should strong healthy plants be topped as soon as the bud appears, or should they be allowed to come near the flowering stage?

(2) Would it be advisable to save a few plants for seed, or is it better to import seed as required?

(3) For the small quantity I am growing, would you advise curing leaf by leaf, or by cutting the entire plant?

(4) In the event of Virginia tobacco plants turning yellow in the seed beds, probably on account of too much water, are they likely to recover the healthy colour after transplanting, and have they a chance to make decent growth if taken proper care of?

Reply.—The Tobacco Expert replied: *Re* Sumatra tobacco, I would advise you to let the plants come well into flower before topping them. You should be certain to save several of the best and finest texture plants for seed for next season. I recommend reaping by the leaf system, by which method you should be able to obtain a uniform ripeness after stringing the tobacco on sticks, as with Virginia tobacco. The leaves can be sweated under grass for a day or two, or they can

be placed in an air-tight room close together until yellow, when they should be opened out to dry. As the Sumatra leaf is of thin texture, it is much easier to dry than other types, and should not require as much space in drying. With regard to yellow plants in the seed beds, if required, you can plant them and they should mature all right, but green plants are to be preferred.

ROTATION CROPS.

A. B. F., Makwiro, writes : I should be glad to know what you would suggest as the best available rotation of crops on average black soil.

Reply.—The Agriculturist and Botanist replied : In our opinion the average black soil of your district is not urgently in need of a rotation. The object of a rotation is to a great extent to maintain fertility, and where the soil is extremely rich rotation should not be necessary for the first three or four years at least. It is somewhat difficult to suggest a rotation without knowing the lines of farming you are following, and whether you grow crops with the idea of direct sale or of conversion into meat products. The following may, however, be taken as suitable to black soils :—Algerian oats, Japanese millet, velvet beans, pumpkins, buckwheat, Boer manna, teff grass, linseed, Egyptian clover, rape. If irrigation is available or the land is naturally moist, black soil of this character should grow good crops of early potatoes planted in August. As I have already said, strong rich soils do not require rotation to the same extent as less fertile soils, except with the object of lessening insect pests.

LUCERNE.

G. B. R. wrote : I quite forgot the other day when writing you to ask if it is safe to graze sheep or calves on growing lucerne. I have an idea that it might blow them up, the same as red clover does at Home.

Reply.—The Agriculturist and Botanist replied: It is not advisable to allow sheep or calves to feed too freely on growing lucerne, as there is considerable danger of their becoming hoven, particularly if not well accustomed to grazing this crop. Hungry animals should never be turned on to a lucerne stand, and, as a matter of fact, during the present year it would be better to refrain from grazing the stand at all, as sheep are very apt to feed out the crown of the plant and so seriously impair its vitality.

FARM CROPS.

N. W. D., North-West Rhodesia, wrote: I am about to conduct experiments on the growing of velvet beans and linseed during the coming season, and I shall be pleased to have any literature or instructions your department may have on the growing and handling of either of these crops. I remember seeing linseed growing at the Salisbury Experiment Farm, and shall be pleased to have your opinion on it as to whether it is likely to prove a paying or suitable crop for this climate.

Reply.—The Agriculturist and Botanist replied: Velvet beans: Sow in drills 3 x 2 ft. apart between the 15th and 20th December. About 25 lb. to 30 lb. of seed is required per acre. The crop requires about five months to mature, and is suitable for any of the heavy classes of soil of moderate fertility, but is not recommended for poor sandy soils. Linseed: The variety which has given the best results is Pskoff. About 30 lb. of seed is sown broad-cast or 25 lb. when drilled in rows 6 in. to 8 in. apart. The time of sowing in Southern Rhodesia may be from Christmas to 7th January. The average yield is about 2½ to 3 bags (200 lbs.) per acre. Linseed needs a rich strong soil, and should be rotated every year. In my opinion linseed is a most valuable crop and extremely well suited to Rhodesian conditions. Had we a cheap method of forwarding to the coast such as water transport, this is a crop which would pay well. At present all our most progressive farmers grow linseed for their own use.

FODDER CROPS.

R. A. B. wrote : I would like to try some permanent forage plants in some of my black lands, and will be much obliged if you would let me know as soon as possible what forage crops have proved successful, and where the seed is procurable. I remember seeing sometime ago a notice of a plant introduced by Col. Napier, and I think named after him. Can you let me know whether this has proved successful?

Reply.—The Agriculturist and Botanist replied : I am not able to recommend any perennial fodder crops which will obviate the necessity of growing annual fodder crops as well. Sugar cane and Napier's fodder are both perennials, and will give green feeding for the greater part of the year ; but a large acreage is necessary, in order to support any considerable number of stock. These crops are mainly valuable for cutting green during early winter and early spring for feeding to stabled dairy stock. Amongst summer crops which can be relied upon, are the following : Algerian oats sown in Christmas week ; Boer manna sown up to 5th January ; teff grass sown any time between the middle of December and the end of January ; also pumpkins, cattle melons and mangels. The latter, however, require a dressing of about six to eight tons per acre of kraal manure. All these crops are suitable to the black vleis soil which you have on your farm.

Correspondence.

POULTRY IN RHODESIA.

To the Editor,

Rhodesia Agricultural Journal.

Sir,

My letter sent to the *Rhodesia Agricultural Journal* last July, and published in the December issue of the *Journal*, has apparently had a rough passage, and received much damage *en route*. As it has evoked a reply from "Gallinule," when I had given up all hope of its appearing in the *Journal*, I must be content.

Let me at once state that for twenty-three out of the number of years I have been upon that portion of the African steppe land between the Vaal River and my present residence, poultry has been but a side issue with me. My work is the study and practice of stock (cattle) breeding, milk and dairy products.

I had been in this country—South-Eastern Rhodesia—but a very little while, when I realised that we were confronted here with the same problem as in other tropical countries, viz., what is the cause of, or rather, the occasion for, the loss of virility and the lessening of fertility by exotic birds and animals, including the human, when brought within a tropical environment? The study of this problem means research in different fields of work which may be widely dissimilar, but if they all point in a certain direction, then when and where they converge may give us an approximation or hypothesis. Hence my breeding of fowls, pigs, and dogs, and since 1901 I have experimented with a few plants according to the method of Gregor Mendel. My experiment with respect to potatoes I attempted to describe to Mr. Jack and Mr. Sim when they favoured me with a visit about two years ago.

Living in an extremely isolated place, I have no opportunity of talking with people on this subject, therefore I welcome and thank "Gallinule" for the courtesy of his reply and criticism, at the same time reminding him that to drag a sentence from its context is apt to be misleading, and, when that sentence is incorrectly quoted, may lead to a serious confusion of thought. This is what "Gallinule" has done in the first sentence of his reply. The quotation should read:—"Fowls as we now know them have never been subjected to the test we are giving them in this country." That is quite correct. I am referring to this country, not an "Isle of Skye" or a "Castle of Spain." The birds the Portuguese introduced were not the improved (?) birds of to-day, but they were the stock from which the improved fowl has evolved, and it is quite fair to assume that those birds were less liable to variation or mutation when brought within the influence of a new environment.

Most certainly I refer to the climatic conditions and altitude we find in this country; but the most important question is the influence of tropical light upon the virility and fertility of birds and animals brought here (tautologous, perhaps! a necessary repetition, I think).

I do not in the least question that Mr. Ronald Weir's experiments with, and knowledge of, fowls were far superior to mine; yet, as I am living on the top of the watershed at an altitude of 6,000 ft., his success at three times that height appears to me phenomenal. Perhaps this is a hasty generalisation of "Gallinule's." But what is interesting in the statement *re* Mr. Weir is, that he "kept Andalusians at Quito from 1887 to 1896 with great success." The question arises, what made him give it up? The period of nine years is of somewhat shorter duration than my experiment; but if I had been interested only in a financial way I should have given them up in four or five years, their increasing sterility making them a loss. I expect that Mr. Weir and myself met with precisely the same results, and, as I also did all the work myself, it is evident that we were working along parallel paths.

If "Gallinule" had read my letter carefully, he would have seen that I expressly stated that experiments in the Deccan were given up many years ago; but they were tried for upwards

of 100 years by men as enthusiastic—if not more so—as “Gallinule.” These men were the sons of yeomen farmers of Great Britain, and the backbone of the East India Company, and they likewise introduced cattle, the very cattle that Mr. Simmons is writing about, and of which there is not a trace left to-day.

Why does “Gallinule” describe the “Brahma” of tropical origin? I have always understood, and am afraid I shall continue to understand, that the breed was “made in North America.” If “Gallinule” remembers, as the present writer well remembers, the craze for birds of Asiatic origin, Indian preferred, that existed in Great Britain 40 years ago—it really began about 15 years previously—he will know that Cousin Jonathan thought it was his duty to help to satisfy that craze, by sending a few birds to England *via* Brahma-Putra and Calcutta. It was in the year 1874 or 1875, when talking with Mr. Tegetmeier upon the subject, that I first learnt how the fowls acquired the name. The product of the cross was not originally known in America by the name “Brahma.” “Gallinule” describes the Brahma as of tropical origin, from the low-lying lands of Bengal. If the low lying lands of Bengal are within the tropics, how is it that our situation here is described as “nearness to the tropics”? (page 266, vol. x., *R.A.J.*) Incidentally, I may remark that I have been a somewhat close student of the Darwinian hypothesis since the year 1872, and have watched with much interest the experiments of others, as well as my own, under the conditions that we have imposed upon ourselves in this country.

Had it not been for a rather florid, but by no means original, passage in which the primeval jungle fowl was recalled to memory (p. 340, vol. ix., *R.A.J.*), I do not think I should have mentioned the *Gallus Bankiva* and *G. Soneratii*; but, wishing for information upon some factors in heredity, I wrote to Ceylon about a year ago, and from the replies it would appear that we have not quite done with the jungle fowl.

Now let me hasten to a finish, by striking upon a note of agreement. “Gallinule” admits having noticed a change in beak and nares. Good! If “Gallinule” thinks that a great alteration in the whole of the breathing apparatus, due to the

physical conditions here, will not take place he is mistaken. If he thinks that correlated morphological variations will not ensue, he is in error. If he thinks that by any process of feeding he will control the alteration of the constituents and quality of fat, he is again in error; and to sum up, if he imagines that by any process of feeding, or selection, he can arrest the adaptation of the fowl to its Rhodesian environment by and through the internal response of its organism, he is under a delusion. It is adaptation or extinction, and the latter appears the likely case.

Although I have answered some of the questions by anticipation in my former letter, I will now answer them in the same order, but not repeating the questions.

(1) 38, which by breeding I raised to 560, and a keen judge of poultry offered me 10s. each for every pullet three and four months old.

(2) No relationship whatever.

(3) I fenced in $\frac{1}{2}$ -acre with reeds, began with three pens, subsequently raised to 21; in addition, three huts about a mile away for especially selected birds.

(4 and 6) I am combining these, as either singly or together they contain matter of some biological interest. Without entering into detail, I will simply remark that the term "equator" is conventional, an abstraction, but, like the mathematical sign of equation, may be got over by a change of sign. If fowls from Great Britain or America are introduced into this country in July or August, begin laying in October, chicks hatched out by the end of November, these chicks are called, as far as this country is concerned, late spring chickens; whereas, in actual fact they are late autumn. Bearing this in mind, I selected and mated accordingly.

(5) Yes, male birds. (I will ask: How soon after its introduction will a male bird commence to lose vigour?)

(7) Most drastic in consequence of increasing sterility of hens.

(8) No maize to birds under experiment. Munga, red and white Kaffir corn, barley and oats, both grown in this country and imported; a little fresh meat chopped fine occasionally. In addition, they had an unlimited supply of the purest running water, and living shade. I have not lost a single fowl through sickness.

There may exist the probability of producing a good utility fowl in Rhodesia; if so, in my opinion it will be produced by selection from indigenous stock. In our attempts to reach this by a short cut, we have been pursuing the "fatal fallacy of mistaken aim."

Yours, etc.,

MATTHEW W. WHITE.

Selborne Farm, Mt. Panga,
6th January, 1913.

[Mr. White's interesting letter was received too late to obtain a reply from "Gallinule" for publication in this issue, but it is hoped to publish his reply in the April number.—ED.]

GLOBULAR LIGHTNING.

To the Editor,

Rhodesia Agricultural Journal

Sir,

Apropos of the very interesting description of globular lightning, given in your December number, a similar and more prolonged occurrence of the phenomenon, recorded by Dr. Aurel Schulz in his "New Africa," may be of some further interest.

The Doctor says: "It was seven o'clock in the evening," [15th August, 1884, 20 miles south of Matambanga, Upper Chobe] "there appeared a pale yellow light, circular in form, about the size of a plate, steadily resting three feet above the ground, apparently eighty yards off, in the black darkness. While looking, the light moved steadily forward and backward

several yards; then, standing still for a time, it afterwards repeated the movements. I expected this to be some ruse of the Mashubia, who had followed us, hoping to bring forth a scare by this unique device. Some ten minutes of this by-play exhausted my patience. I took the four-ounce gun, and, putting a tree between myself and the light, moved about half way towards it. When I peered out from behind my cover the light was gone, but in the moment there appeared a large, dark shadow about the size of an ox, though lower, moving ten yards in front of me. I pulled off at this, but the flash of the gun revealed that I had been mistaken. After a space of a few minutes the light appeared again in its faded yellow entirety. I went quietly to sleep till awakened to take my watch, when the light was still in full action, and remained so until with the first streak of dawn it disappeared. With daylight we hunted the spot in vain for traces of animal or bird spoor. From enquiries made later we have not been able to get at the cause of this light. The fact remains, and therefore I record it. The elucidation will surely follow some day."

I am, etc.,

A. GIESE.

9th January, 1913.

Reviews.

Pioneer Irrigation and Light Railways, published by Crosby, Lockwood & Son, of Stationers' Hall Court.

The Executive Engineer of the P.W.D., Bombay, Mr. E. O. Mawson, M.I.C.E., has compiled a very serviceable manual on "Irrigation," and his friend, Mr. E. R. Calthrop, M.I.C.E., M.I.M.E., has added two chapters of particularly valuable sound and practical advice on "Light Railways." The attractive feature of the work to Rhodesian settlers will be the simplicity of the advice how best to utilise all water available with the least possible outlay for the irrigation of crops, with the risk of failure and loss reduced to a minimum.

Only contrivances which the farmer can make and work himself are recommended, and where professional advice and skilled labour will be called in, the layman can read up and be better able to understand the "why and the wherefore" of all the works undertaken.

Mr. Calthrop writes: "The total cost of a light railway on the 2 ft. 6 in. gauge with 35 lb. rails, and equipped with rolling stock, will vary very considerably. £2,000 per mile may be accepted as the minimum cost, completed under the most favourable conditions with a modest equipment of rolling stock. £3,000 per mile will cover an average amount of bridging, cutting, and embanking in undulating country, and include rolling stock sufficient to carry the considerable traffic which will exist to warrant the expenditure of this amount of capital. Any excess over £3,000 can only be caused by a necessity for works of unusual magnitude or costliness or by the circumstances demanding an unusually heavy equipment of rolling stock."

The above approximate estimates relate to a 2 ft. 6 in. light railway of heavy traffic capacity, but by diminishing the traffic capacity, and reducing axle loads from 5 to 3 tons, and

weight of rails from 35 to 25 lbs., the cost per mile may, under the most favourable conditions, be reduced to between £1,200 and £1,500. With the 3 ton axle load, reduction of the gauge to 2 ft. would, under the same favourable conditions, make the cost between £1,000 and £1,300 per mile. Below these figures it is still possible to construct a railway, but only of the private plantation type.

For light railways, the two most useful gauges are 2 ft. 6in. and 2 ft. The former may be regarded as the ideal gauge for a light railway of heavy traffic capacity, and experience shews that of all gauges it possesses the highest traffic capacity per cent. of cost of track. The 2 ft. gauge possesses approximately only about half the traffic capacity of the 2 ft. 6in. gauge, due to the "maximum useful axle load" being smaller, stowage capacity of wagons being inferior, and the diminished hauling power and speed of locomotives. The traffic capacity of a narrow-gauge light railway is determined partly by width of gauge and partly by weight of rail, and the safe maximum axle load which can be placed upon the weight of rail selected.

Land Titles in Southern Rhodesia, by H. Bertin, Solicitor of the High Court : The Argus Printing & Publishing Co., Salisbury.

This is a work which should be welcomed by farmers and settlers of this country, dealing, as it does, with the somewhat complicated question of land tenure in Southern Rhodesia. In the volume will be found a study of the British South Africa Company's title ; such copies of all the different kinds of grants made by the Company as an exhaustive search could discover ; comments on and explanations of the varying stipulations and terms of the grants ; and the text or extracts of the principal laws affecting them.

It will be seen that the ground traversed by the author is sufficiently comprehensive. Mr. Bertin has dealt with his subject thoroughly, and the book constitutes a valuable addition to the works of reference on this country.

List of Live Stock

for which permits for importation into Southern Rhodesia from Cape Colony and Orange Free State were granted during 1912 :—

Shorthorn Bulls...	24
Shorthorn Heifers...	121
Africander Bulls...	18
Africander Heifers ...	57
Cross-bred Bulls...	98
Cross-bred Heifers ...	3,179
Ayrshire Bulls ...	3
Ayrshire Heifers ...	6
Friesland Bulls...	15
Friesland Heifers ...	57
Devon Bulls...	31
Devon Heifers ...	17
Red Poll Bulls...	2
Red Poll Heifers...	35
Hereford Bulls ...	4
Hereford Heifers ...	6

3,673

SHEEP.

Persian Rams ...	2
Merino Rams...	3
Merino Ewes ...	98
Oxford Down Rams...	3
Shropshire Rams ...	3

109

Pigs.

Berkshire Boars...	2
Berkshire Sows...	5
Tamworth Boars ...	1
Yorkshire Boars ...	1
Pigs, ordinary...	148

157

Veterinary Report.

November, 1912.

SALISBURY.

AFRICAN COAST FEVER.—No fresh outbreaks and no further cases on the infected section of the Commonage.

RABIES.—The inoculations from the suspected rabid dog, referred to in last month's report, shewed that the animal was affected with rabies. The existence of rabies in a dog destroyed at Mr. McIlwaine's residence adjoining the Commonage was similarly demonstrated. Two dogs shewing typical symptoms of dumb rabies were destroyed, one at the Epworth Mission Farm, the other on the Commonage.

TRYPANOSOMIASIS.—The Government Veterinary Bacteriologist reports as follows :—"Animals inoculated from a native, a dog, and a goat naturally infected with trypanosomiasis in the Sebungwe district have revealed trypanosomes of the "Nagana" type, indistinguishable from one another, and from the trypanosome of human trypanosomiasis of Northern Rhodesia. In each strain parasites have been met with having the nucleus in the posterior third, a feature at one time considered diagnostic of *Tryp. Rhodesiense*. Mechanical transmission from an infected to a healthy rabbit resulted from the first experiment by interrupted feeding of *G. Morsitans* bred at the Laboratory from pupæ sent by Dr. Stohr from the Sebungwe district."

BULAWAYO.

AFRICAN COAST FEVER.—No fresh outbreaks and no further cases on any of the infected centres.

ANTHRAX.—After five months' freedom the disease reappeared on the farm Umganin. One ox died during the month.

MALLEIN TEST (including Gwanda and Plumtree).—Horses, 14; Mules, 39; Donkeys, 76.

PLUMTREE.

PLEURO-PNEUMONIA CONTAGIOSA (LUNGSICKNESS).—No further cases.

UMTALI.

AFRICAN COAST FEVER.—No fresh outbreaks and no further cases on the infected section of the Commonage.

IMPORTATIONS.—Thirty-three head of slaughter cattle from Macequece.

MORTALITY AMONGST CATTLE.—Fourteen deaths reported and investigated. No suspicion of infective disease in any case.

HARTLEY.

A suspected case of pleuro-pneumonia contagiosa (Lungsickness) was reported, but on investigation no evidence of this disease was found.

VICTORIA.

RABIES.—A native dog suspected of being rabid was destroyed on the farm Junction, after biting several of the farm dogs.

MALLEIN TEST.—Four horses and fifty-two mules *ex* Transvaal were tested with mallein, and proved free from glanders.

GENERAL.

All other districts reported healthy. The mortality from poverty as the result of the drought was very heavy, especially in the southern districts.

J. M. SINCLAIR,
Chief Veterinary Surgeon.

Veterinary Report.

December, 1912.

SALISBURY.

AFRICAN COAST FEVER.—No fresh outbreaks and no further cases on the infected section of the Commonage. The last death from Coast Fever on this centre occurred in May last.

RABIES.—No fresh cases. The Rabies Regulations are in force in the native district of Salisbury.

REDWATER.—Four deaths occurred from acute redwater.

ARSENICAL POISONING.—Eleven head of cattle died at Borrowdale from acute arsenical poisoning. At first the source of the arsenic could not be traced. Subsequently an old tin of dip was found in a furrow near the kraals.

VEGETABLE POISONING.—As usual at this season of the year, a considerable number of cattle succumbed to vegetable poisoning.

BULAWAYO.

AFRICAN COAST FEVER.—No fresh outbreaks and no further deaths at any of the infected centres.

ANTHRAX.—No further cases on the infected farm Umganin.

MALLEIN TEST.—The following animals were tested with mallein on importation and found free from glanders:—Horses, 15; mules, 27; donkeys, 49.

IMPORTATIONS.—Bulls, 6; heifers, 337; sheep and goats, 4,872.

PLUMTREE.

LUNGSICKNESS (*Pleuro - Pneumonia contagiosa*). — No fresh developments.

UMTALI.

AFRICAN COAST FEVER.—No fresh outbreaks and no further cases on the infected section of the Commonage. The last death from Coast Fever on this area occurred in March.

ARSENICAL POISONING.—Eighteen head of cattle died on the farm Barrydale from arsenical poisoning. Investigation shewed that the cattle had licked the ground in the spraying kraal where a tin of arsenical dip had been standing for some eighteen months. This tin was covered over, but there is little doubt that the dip had leaked out and saturated the ground, as a sample of the earth revealed the presence of a large quantity of arsenic.

MELSETTER.

MALLEIN TEST.—Two horses, one mule, and two donkeys: were tested on importation, and found free from glanders.

VICTORIA.

REDWATER.—Three Shorthorn heifers and one Devon bull imported from Cape Colony died of redwater and gallsickness.

GENERAL.

All other districts reported healthy. Good rains fell generally in Mashonaland during the month, and resulted in a very speedy improvement in the condition of stock. In Matabeleland little rain fell, and heavy mortality in cattle from poverty occurred.

J. M. SINCLAIR,
Chief Veterinary Surgeon.

Agricultural Report.

20th January, 1913.

Quite a transformation in the agricultural position has occurred since we wrote our last report in the December number of the *Agricultural Journal*. At that time the drought was unbroken, and matters by no means looked promising for the ensuing season. Since then, however, splendid rains have fallen throughout Mashonaland, and by Christmas the majority of farmers had planted the bulk of their crops. Green grass quickly sprung up and practically everywhere cattle have recovered from the stress of the prolonged dry season. Many farmers have doubled their acreage this season, and should the auspicious conditions of the early part of the season continue, splendid harvests should be reaped.

There is one matter which is causing some disquietude in various parts of the country, and that is the tendency of some tobacco plants to come into bud and to sucker prematurely. The cause of this abnormal condition, which has been noticed before in this country, has not yet been determined, but it is probable that investigations into the matter will be undertaken by the Department of Agriculture. As far as can be gathered the percentage of plants so affected is not great, and it is not expected that the crop will suffer to any appreciable extent.

Prospects are not so bright in Matabeleland, where very little rain has fallen up to the present. At Gwanda the crops are not doing well, and stock continues to suffer from the lack of good feed. The rainfall in the Gwelo district has also been scanty, and the crops planted during a brief wet spell are suffering. Cattle, however, are improving on what grass there is. Belingwe has been favoured with good rains, and the crops look promising. The grass is good, and all stock are picking up in condition. There were very few losses in this district as a result of the drought.

Garden Calendar.

By N. L. KAYE-EDDIE.

THE FLOWER GARDEN.

February.—During this month the flower garden is gradually approaching perfection, and nearly all plants are in bloom. If these are constantly plucked the yield will be increased, and, except where required for seed, all flowers should be removed as they fade, for seeding shortens the life of many plants. All runners and creepers should have constant attention, and be tied up and trained. Dahlias in more exposed positions should be carefully tied to their stakes, as they now become top heavy with the weight of their blooms. Palms in the house and conservatory will benefit much if occasionally put out in the rain.

March.—During this month the garden should be seen at its perfection, and, owing to our rains, requires a great deal of attention in order to keep the soil free from weeds and caking. Drainage should also be looked to, in order to avoid plants being swamped or washed away. Dahlias and carnations should now be in their heaviest bloom, and will require tying up, and the dying blooms should be removed, in order to prolong their flowering period. Plants for winter flowering should be now coming on and planted out.

Cuttings of carnations may now be made, and should be picked from the choicest plants, and taken from stems which have borne the finest blooms. The cuttings should be placed in boxes containing sand and kept in a moist condition in a warm position sheltered from the winds. These should be ready for planting out in about two months, and bloom in three. Carnations, verbena, antirrhinum, penstemon, pansy, dianthus, phlox, calliopsis and escholtzia may be sown for early blooming next spring.

THE VEGETABLE GARDEN.

February.—Potatoes should receive attention and be carefully ridged up and care taken that the stalks are not buried. Seeds for winter crops should be sown, such as beet, Brussels sprouts, cabbage, carrots, beans, peas, onions, turnips, tomatoes, etc. Vegetables planted out during this month might be placed a little closer together than usual, as watering may have to be resorted to before they mature.

March.—Tomatoes, peas and beans should be in full bearing, and should be staked and tied. Weeding and cultivation should be extensively carried out. Seeds for late winter crops—beans, cabbage, cauliflower, peas, radish, turnips, spinach, and beet—should be sown.

ESTABLISHING A HEDGE.

PRIVET (*Ligustrum Japonicum*).—The Japanese privet is a hardy plant, and grows excellently in parts of this country. It makes an exceedingly handsome hedge in a few years, and is easily grown from seed or cuttings. Sow the seeds in boxes or in the open ground, and as soon as the plants are large enough for handling, pick them out into tins in order to establish hardy plants. Cuttings may be planted directly into the trench prepared for the hedge. The trench should be dug two feet deep and nearly that in width and filled in to a foot with good rich soil. The plants are then put in about nine inches apart; cuttings of course should be closer to allow for failures. When the plants are well established, prune them down to about an inch above the soil in the trench, and, when about a foot of growth has been made, fill up the trench another six inches: The above process is again repeated and the trench will then be filled up to the level of the surrounding soil. Each plant will now have a bushy appearance with several stems instead of one, thus making the basis of the hedge thicker and more compact. The result later, if this system of continually cutting back is practised, is a massive and beautiful hedge.

Market Reports.

22nd January, 1913.

The produce market in Salisbury is very quiet, high prices ruling, and very little business being done. Mealies are not forthcoming, and prices are likely to go higher. The market is glutted with potatoes and onions, but monkey nuts and beans, for which there is a keen demand, are still practically unobtainable. There is a good supply of oat forage, but very little manna is being sent in. The superabundance of excellent veld feed has, of course, affected the demand for forage, and there is very little enquiry for local hay. There is a good supply of butter and eggs, which are readily disposed of.

In Bulawayo the prices for grain still continue on the upward grade. Increased prices are being asked from the south, and there is a general reluctance to sell. The prospects for the season's crops are gloomy, the rainfall everywhere being short.

Article.	Johannesburg.	Kimberley.	Bulawayo.	Salisbury.
Barley, 150 lbs. -	12/6 13/6	—	—	27/6 30/0
Beans, 203 lbs. -	35/0 42/0	—	—	none
Boer Meal, unsifted, 200 lbs. -	—	—	43/0 44/0	37/6 40/0
Bran, wheaten, 100 lbs. -	7/9 8/6	7/0 7/6	12/6 13/0	15/6 16/0
Flour, 100 lbs. -	—	—	25/6 26/6	20/0 24/0
„ Colonial, 100 lbs. -	—	—	23/6 24/6	none
Forage, 100 lbs. -	5/6 6/3	4/6 6/6	10/6 11/0	7/6 8/0
„ Colonial Oat -	7/0 7/3	—	—	none
Hay -	Bale. 10d. 1/6	—	Ton. 80/0	Ton. 45/0 50/0
Kaffir Corn, 200 lbs. -	21/0 22/0	16/6 18/6	27/0 27/6	none
Manna, 100 lbs. -	—	—	—	5/0 7/6
Mealies, S. A. White, 203 lbs. -	19/0 19/10	—	26/6 27/0	24/0 25/0
Mealies, Yellow, 203 lbs. -	19/6 20/0	16/0 18/6	25/6 26/6	none
Mealie Meal, White, 200 lbs. -	—	25/6 31/0	—	24/6 26/0
Munga, 200 lbs. -	—	—	—	none
Monkey Nuts, bag -	—	—	21/0 22/6	20/0 22/6
Oats, 150 lbs. -	11/6 12/6	10/0 11/0	21/0 21/6	24/0 25/0
Onions, 120 lbs. -	8/0 14/6	8/0 10/6	15/0 16/0	10/6 15/0
Peas, 200 lbs. -	28/0 33/0	—	—	none
Potatoes, new, 150 lbs. -	9/0 15/0	10/6 24/0	27/6 30/0	20/0 22/6
„ 150 lbs. -	—	—	—	none
Rapoko -	—	—	—	none
Rye, 200 lbs. -	19/0 21/0	—	—	none
Salt, 200 lbs. -	—	—	10/6 11/0	14/0 15/0
Wheat, 203 lbs. -	21/0 23/0	22/0 24/0	—	30/0 32/6
Butter, local, per lb. -	10d. 1/0	1/3	1/6 1/9	1/9 2/0
Eggs, local, per dozen -	1/3 2/3	10d. 2/0	1/6 2/6	3/0
Ducks, each -	2/0 2/10	2/6 3/0	—	3/6 5/0
Fowls, each -	1/6 2/4	1/3 2/6	1/8 2/3	2/6 5/6
Geese, each -	3/6 5/0	—	—	9/0 11/0
Turkeys, cocks, each -	8/0 12/6	4/0 9/0	—	11/0 17/6

LIVE STOCK.

Slaughter Cattle, 100 lbs. -	38/6	—	42/6 45/0	50/0 55/0
Trek Oxen, trained -	£8/10 £9/10	—	£8/10 £12	£10 £10/10
Local Cows, milk -	—	—	£25 £30	£25 £30
Dairy Cows -	£16 £35	—	£25 £35	£25 £30
Native Cows -	—	—	—	—
Heifers, Colonial -	£5 £7/10	—	£10 £17/10	£9 £11/11
„ Native -	—	—	—	£6 £7/10
Pigs, live weight -	3½d. 5d.	—	—	4d.
Horses, riding, salted -	—	—	—	£35 £45
„ „ unsalted -	£10 £21	—	£25 £35	£20 £25
Mules, inoculated -	£18 £35	—	£35 £40	£25 £35
Donkeys, geldings -	£5/10 £7/10	—	£8/10 £10/10	£4 £6
„ mares -	—	—	—	£6 £8/10
Goats -	—	—	—	10/0 16/0
Persian Ewes -	—	—	—	24/0 25/0
Cross-bred Ewes -	—	—	—	18/0 21/0
Sheep, slaughter -	Merino 23/6 27/6	—	—	25/0 27/6

Weather Bureau.

TEMPERATURES.

STATION	NOVEMBER		DECEMBER	
	Max.	Min.	Max.	Min.
MASHONALAND—				
Charter, Grootfontein ...	92·2	57·1	—	—
Hartley, Giant Mine ...	93·2	67·4	82·1	64·3
„ Hallingbury Farm ...	95·8	61·2	83·0	62·3
Lomagundi, Sinoia ...	95·2	53·7	85·6	55·6
Melsetter, Government Offices ...	82·2	59·1	73·9	56·5
„ Mount Selinda ...	84·2	60·8	75·5	61·0
Salisbury, Agricultural Laboratory ...	88·1	59·9	76·7	58·8
„ Chishawasha ...	91·1	57·8	77·1	59·7
„ The Gaol ...	88·6	60·3	76·4	58·9
„ Shamva Mine ...	91·3	66·1	79·2	62·1
Umtali, Chiconga's Location ...	93·2	63·1	82·4	62·4
„ Summerfield ...	85·1	59·4	73·4	57·0
Victoria ...	90·2	61·0	82·1	62·2
MATABELAND—				
Bulawayo, Essexvale ...	93·3	63·1	85·8	64·2
„ Observatory ...	90·9	62·2	83·9	61·0
„ Rhodes Matopo Park ...	93·1	63·4	86·6	61·8
Gwelo, The Gaol ...	91·4	60·4	81·4	59·4
Mangwe, Empandeni ...	92·8	63·7	87·2	63·9
Tuli, Police Camp ...	104·2	69·5	96·3	70·1
Wankies, Victoria Falls ...	98·7	66·6	89·9	65·3

RAINFALL.

STATION	Nov.	Dec.
MASHONALAND :		
Charter—		
Driefontein ...	0·06	3·80
Enkeldoorn ...	0·24	5·82
Grootfontein ...	Nil	—
Marshbrook ...	0·69	4·88
The Range ...	0·55	5·66
Rhodesdale Estate ...	Nil	3·92
Umvuma (Railway) ...	0·10	5·12

RAINFALL—(Continued).

STATION			Nov.	Dec.
MASHONALAND—(Continued)				
Hartley—				
Ardgowan	...	...	0·11	3·27
Battlefields (Railway)	...	...	0·12	5·21
Elandsfontein	...	...	0·46	7·63
Elvington	...	...	—	7·09
Franceys	...	...	—	5·02
Gatooma	...	...	0·14	6·94
Gatooma (Railway)	...	...	0·12	7·18
Giant Mine	...	...	Nil	6·62
Gowerlands	...	...	Nil	5·68
Hallingbury	...	...	1·40	5·39
Hartley (Gaol)	...	...	—	—
Hartley (Railway)	...	...	Nil	8·71
“Jenkinstown”	...	...	0·02	5·30
Makwiro	...	...	0·13	8·94
Shagari	...	...	0·88	4·83
“Stoneygate”	...	...	0·05	5·87
Lomagundi—				
Banket Junction (Railway)	...	...	1·18	10·77
Darwendale	...	...	0·96	9·72
Duxbury Farm	...	...	0·38	5·17
Eldorado (Railway)	...	...	0·25	6·73
Kanyemba	...	...	Nil	6·12
Lone Cow Estate	...	...	0·76	—
Palm Tree Farm	...	...	0·22	4·65
Sinoia	...	...	1·04	8·71
Makoni—				
Eagle's Nest	...	...	0·82	8·79
Inyanga	...	...	0·79	11·72
Monte Cassino	...	...	1·52	7·37
Rusape	...	...	1·00	4·79
Rusape (Railway)	...	...	1·30	2·10
York Farm	...	...	0·19	12·40
Mangwendi—				
Bonongwe	...	...	1·46	6·75
Glen Somerset	...	...	0·64	13·11
“Good Hope”	...	...	0·34	—
Land Settlement Farm	...	...	0·02	5·74
Macheke	...	...	0·82	8·17
Marandellas (Railway)	...	...	0·46	4·53
Mrewa	...	...	0·95	9·89
Mtoko	...	...	—	—
Mungo Estate	...	...	—	5·85
Rusawi (Outspan)	...	...	0·58	5·16
Selous Nek	...	...	0·45	11·95
Tweedjan	...	...	0·29	6·58
Mazoe—				
Avonduur	...	...	0·37	17·68
Claverhill	...	...	0·52	11·39
Darwin	...	...	0·08	5·86

RAINFALL—(Continued).

STATION				Nov.	Dec.
MASHONALAND (Continued)					
Mazoe (Continued)					
Dunmaglas	...	...	...	0·80	13·45
Kimberley Reefs	...	...	...	0·42	11·15
Laguaha	...	...	...	0·49	11·92
Lowdale	...	...	...	0·70	9·17
Mazoe	...	...	...	0·78	13·21
Omeath	...	...	...	0·98	11·45
Sleamish	...	...	...	0·15	17·40
Sunnyside	...	...	...	0·92	13·36
Teign	...	...	...	0·81	14·98
Umvukwe Flats	...	...	...	0·72	8·51
Melsetter—					
Chikori	...	...	...	0·34	4·55
Chipinga	...	...	...	0·09	10·82
Helvetia	...	...	...	—	11·68
Mutambara Mission	...	...	...	0·62	3·83
Melsetter	...	...	...	0·22	11·15
Mount Selinda	...	...	...	0·83	8·15
Tom's Hope	...	...	...	0·46	13·06
Vermont	...	...	...	0·42	—
Salisbury—					
Agricultural Laboratory	...	...	...	0·72	7·66
Avondale	...	...	...	0·55	6·62
Brookmead	...	...	...	—	—
Chishawasha	...	...	...	1·09	11·44
Cleveland Reservoir	...	...	...	0·79	8·26
Goromonzi	...	...	...	0·29	13·49
Hillside	...	...	...	1·16	—
Meadows	...	...	...	0·20	14·86
Public Gardens	...	...	...	0·76	8·04
Rhodesville	...	...	...	1·15	8·56
Riversdale	...	...	...	0·40	3·05
Salisbury (Gaol)	...	...	...	0·95	9·15
„ (Railway)	...	...	...	0·93	9·41
Shamva	...	...	...	—	—
„ Mine	...	...	...	0·58	12·77
Stapleford	...	...	...	—	—
Westridge	...	...	...	0·64	7·09
Umtali—					
Chiconga's Location	...	...	...	0·01	11·17
Champion Mine	...	...	...	0·36	6·97
Premier Estate	...	...	...	0·77	9·81
Selim Mine	...	...	...	0·45	6·50
Summerfield	...	...	...	0·75	10·02
Umtali (Gaol)	...	...	...	—	—
„ (Railway)	...	...	...	0·38	7·66
Utopia	...	...	...	1·91	7·52

RAINFALL (*Continued*).

STATION				Nov.	Dec.
MASHONALAND—(Continued)					
Victoria—					
Chilimanzi	...	...	...	0·09	5·28
Chingombie	...	...	...	0·10	6·01
Chibi	...	...	...	—	4·63
Chiredzi Rancho, Ndanga	...	...	...	—	2·19
Empress Mine	...	...	...	0·76	7·80
Gokomere	...	...	...	0·35	2·62
Gutu	...	...	...	1·02	3·94
Halliday's Farm	...	...	...	0·38	3·01
Marah Rancho	...	...	...	—	7·12
Marthadale	...	...	...	0·41	4·01
Morgenster	...	...	...	0·54	4·58
Noeldale	...	...	...	0·90	5·28
Pamushana	...	...	...	1·33	5·32
Silver Oaks	...	...	...	0·36	2·21
Victoria	...	...	...	0·51	2·79
MATABELELAND :					
Belingwe—					
Dawn Farm	...	...	...	0·10	2·43
Filabusi	...	...	...	1·15	1·30
Fort Rixon	...	...	...	0·25	1·41
Infiningwe	...	...	...	0·44	3·28
Tamba	...	...	...	Nil	—
Bubi—					
Insize	...	...	...	Nil	6·84
Inyati	...	...	...	—	—
Maxim Hill	...	...	...	0·37	1·51
Bulalima—					
Figtree	...	...	...	0·54	2·53
Magot	...	...	...	1·20	2·25
Marula	...	...	...	0·74	—
Plumtree	...	...	...	—	—
Solusi	...	...	...	0·30	1·49
Syringa	...	...	...	Nil	0·32
Tegwani	...	...	...	0·46	0·11
Bulawayo—					
Balla Balla	...	...	...	1·33	0·44
Bembesi	...	...	...	0·22	2·41
Dewhurst	...	...	...	0·52	5·11
Edwaleni	...	...	...	—	—
Essexvale	...	...	...	0·20	0·92
Government House	...	...	...	0·58	—
Gwaai (Railway)	...	...	...	0·25	4·40
Heany Junction (Railway)	...	...	...	0·02	2·52
Hope Fountain	...	...	...	0·75	1·73

RAINFALL (*Continued*).

STATION	Nov.	Dec.
MATABELELAND—(Continued)		
Bulawayo (Continued)		
Imbesa Kraal	0·02	2·38
Khami	1·23	2·52
Lochard Experiment Farm	0·07	1·83
Matopo Mission	1·20	0·99
Melinakanda Junction	Nil	1·20
Mpondeni	—	—
Nyamandhlovu (Railway)	0·18	2·62
Observatory	0·16	1·08
Pendennis	0·46	2·98
Raylton (Railway)	0·15	1·34
Rhodes Matopo Park	0·37	0·85
Thornville	0·02	2·23
Umgusa	1·30	1·03
Gwanda—		
Antelope Mine	—	1·14
Gwanda (Railway)	0·25	0·14
Malundi	0·31	0·77
Mtshabzi Mission	0·38	0·73
West Nicholson (Railway)	0·08	0·72
Gwelo—		
Globe and Phoenix	0·09	5·57
Gwelo (Gaol)	0·18	4·68
Gwelo (Railway)	0·21	4·48
Lalapanzi	0·12	4·53
Lower Gwelo	0·36	2·46
Que Que	—	—
Selukwe (Railway)	0·41	5·67
Shawlands	0·38	5·04
Mangwe—		
Empandeni	0·17	2·34
Garth	0·85	0·87
Sebungwe—		
Gokwe	—	4·79
Kariyangwe	Nil	—
Tuli—		
Lamulas (Liebig's Estate)	Nil	—
Manyoni	Nil	—
Mazunga	Nil	—
Section II.	0·01	—
Tuli	Nil	3·18
Wankies—		
Malindi (Railway)	1·23	4·81
Victoria Falls (Police Camp)	0·73	4·94
Victoria Falls (Railway)	0·92	5·51
Wankies Hospital	0·26	2·86
Wankies (Railway)	0·09	3·53

Departmental Notices.

Information for Farmers

The Department of Agriculture is prepared to furnish to farmers technical advice either by correspondence, or, where possible, by personal visits. All communications should be addressed in the first instance to the Director of Agriculture.

Crops

The Agricultural Branch deals with enquiries relating to agricultural practice, soils, crops, cultural operations, processes, seeds, trees, farm implements and machinery, etc.

Poisonous Plants

It is of great importance that as soon as possible a study should be made of those plants found in Southern Rhodesia which are poisonous or deleterious to small or large stock. Farmers and others who have known, or suspected poisonous plants on their property, are requested to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, at the same time forwarding specimens of the plant, including stem, leaves, flowers, and, where possible, fruit. Any particular regarding the habits of the plant will be welcomed, and in return the Department will supply all available information regarding the plants.

Disposal of Seeds

All farmers and others who have surplus supplies of good quality locally grown farm seed of any description are invited to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, stating what

quantities are available for sale, and price f.o.r. nearest station. In all cases representative samples of the grain must accompany the letter, but need not exceed two ounces in weight.

The Agricultural Department is continually receiving enquiries as to where various seeds can be obtained, and it is hoped that by the above means growers of reliable seed may be brought into touch with one another.

It must be clearly understood, however, that beyond recommending sources of supply, the Department cannot take any further part in the transaction.

Sale of Paspalum Plants

Roots of this valuable winter pasture grass, suitable both for moist and dry situations, will be available for sale from December onwards at the rate of 5s. per 1,000 slips f.o.r. Salisbury. A root can be broken up into from thirty to fifty or more slips and, when ordering, the number of slips required should be stated. Applications, accompanied by remittance, to be addressed to the Government Agriculturist and Botanist, Department of Agriculture, Salisbury.

Tobacco

The services of the Tobacco Expert are available to all desiring advice on the subject. Applications should be accompanied by particulars of the nature of the information sought, also the distance and direction of the farm from some well known centre.

Live Stock

The Animal Industry Branch is prepared to advise with regard to all matters connected with stock breeding, selection and feeding of stud animals, the dairy industry, poultry management, farm buildings for stock, and kindred subjects. Buyers and sellers of stud stock in Rhodesia are also put in touch with one another.

Purchase of Stock in the Cape and Free State Provinces of the South African Union, on behalf of Farmers resident in Southern Rhodesia

The following amended arrangements are published for general information :—

The Government undertakes the purchase of pure-bred live stock for farmers on the conditions outlined below, and on the following terms of payment, viz. :—(1) a deposit on application ; (2) one-third total cost on delivery, less amount of deposit ; (3) one-third after six months, and (4) one-third after twelve months—both these instalments bearing interest at 6 per cent. or 10 per cent. if not paid at due date. These terms of credit will only be allowed on purchases up to a total maximum value of £200 ; sums exceeding that amount are payable in cash along with the first instalment. The Government reserves the right to refuse, without reason given, applications, or to fulfil purchases even after deposit has been made. Applications must be on the prescribed Form “A,” and all conditions complied with before same is registered. Applications will be considered in rotation, but fulfilled as opportunity serves, so that animals may be procured as cheaply as possible. The buyer must undertake to accept the animal allotted to him, unless it fails to satisfy description as given in the application form. Disputes may be submitted to arbitration. The purchase price will include all expenses up to time of delivery, price paid to original owner, commission and charges of buyer and freight, including, where necessary, attendance and keep on journey. With every application a deposit must be forwarded ; £1 per head in the case of cattle, horses and donkeys, and 5s. per head for sheep, goats and pigs. Such deposit will be deducted from the amount of the first instalment due, but may be forfeited in the event of the application being withdrawn after having been registered. Stock is not to be disposed of without the written consent of the Director of Agriculture until payment is completed.

Purchases will be made by the Department of Agriculture through its authorised representatives. Every effort will be made to secure animals in accordance with particulars furnished by applicants, and to the best advantage. All purchases must conform strictly to the importation regulations as

regards age and freedom from contact with contagious disease. Pedigrees, if obtainable, will be supplied. The Government will bear all risks of transport and of death from any cause until delivery, all losses being chargeable to the vote. All animals failing to pass the necessary test on arrival shall be destroyed and the loss borne by the Government, and another animal purchased for the applicant.

Prospective buyers will be advised of the probable cost. The Department does not undertake to purchase stock at precisely the prices specified by applicants, but will endeavour to approximate as nearly as possible to the figures given and not to exceed same by over 20 per cent. The authorised representatives of the Department will be allowed a reasonable commission, with expenses additional.

The first instalment will become due and payable on delivery. Applicants or their agents will be advised regarding arrival of their stock, after which all responsibility on the part of the Department will cease.

Entomology

The Government Entomologist advises on matters connected with insect pests of live stock, crops, and fruit trees, and also undertakes the inspection of nurseries and of the importation of plants from abroad.

Chemical Analyses

The Government Agricultural Chemist deals with matters relating to the composition of soils, fertilisers, farm produce of vegetable or animal origin; also the investigation of poisons and of articles of potential economic value.

Nominal charges are made, which, while not covering the cost, will help to defray the expense and serve as a proof of good faith. Samples, carriage prepaid, together with full particulars regarding the subject should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

A schedule of charges and directions for taking samples will be furnished on application.

With all analyses, reports will be furnished explanatory of the results and, when possible, advice given as to the nature, properties and value of the material.

No charge will be made for analysis where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Services of Government Veterinary Surgeons

1. The services of Government Veterinary Surgeons are available to the public, free of charge, for the following purposes only :—

- (1) Attending and giving professional advice in connection with the following diseases, viz. :—Anthrax, Contagious abortion, East Coast Fever, Epizootic Lymphangitis, Foot and Mouth Disease, Farcy, Foot-rot, Heartwater, Glanders, Intestinal parasites amongst sheep and goats, Liver Disease, Lungsickness, Osteo Porosis, Malarial Catarrhal Fever (blue tongue), Rabies, Redwater, Rinderpest, Scabies, Sponziekte (quarter evil), Swine Fever, and any other diseases which may in future be scheduled in terms of section 3, sub-section 18 of the “Animals Diseases Consolidation Ordinance, 1906.” Attending to cases of disease amongst live stock which, though not of a contagious or infectious character, may be of general public importance.
- (2) Applying tests in regard to Glanders, Tuberculosis, or any other disease against the introduction or spread of which tests are applied under regulations.
- (3) Inoculations against the following diseases :—
Horsesickness, Lungsickness, Anthrax, Quarter Evil, Redwater, Malarial Catarrhal Fever (blue tongue). A fee to cover the cost of serum and virus will be charged.

2. The following charges shall be made and payable for services rendered by the Government Veterinary Surgeons in other cases, viz. :—

	£	s.	d.
(1) For every professional visit within three miles of his office or residence	0	5	0
(2) For every professional visit beyond such distance plus an additional charge of 2/6 per hour whilst engaged in such visits or £2/2/0 a day of 24 hours ;	0	10	6
(3) For advice given at the Veterinary Surgeon's office, for each animal, per visit	0	2	6
(4) The following to be charged in addition to visiting fees :—			
a. For every examination as to soundness, each	1	1	0
b. For castration, horses, each	1	1	0
c. For castration, bulls, each	0	5	0
d. For castration, donkeys, each.. ...	0	10	6
e. For parturition cases, mares, each	2	2	0
f. For parturition cases, cows, each..	1	1	0
g. For other operations, according to nature, from 5/- to £2/2/0.			

3. Double the above fees will be payable for services rendered on Sundays; public holidays, and between the hours of 7 p.m. and 7 a.m.

4. Applicants for the services of Government Veterinary Surgeons must at their own cost provide the necessary transport for the conveyance of these officers from, and back to, their residence or nearest railway station.

5. Farmers and owners of stock throughout the country frequently telegraph for a Government Veterinary Surgeon to be sent to attend an animal which has been taken seriously ill. It is rarely possible to comply with these requests at once, as the Veterinary Surgeon may be engaged on duty which he cannot leave, or is at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any service in an urgent case. Hence much valuable time

is wasted, the owner of the animal is dissatisfied, and the veterinary staff discredited. To obviate this, in all cases where veterinary advice and assistance are required, the owner should telegraph to "Veteran," Salisbury, with prepaid reply, the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible. This will enable the Chief Veterinary Surgeon to telegraph advice at once and state whether he is able to arrange for veterinary attendance on the case or not, and save valuable time, which is always of importance in acute cases.

6. The services of Government Veterinary Surgeons will only be available for private work with the consent of such officers, and when such work does not interfere with their official duties, or when the services of a private practitioner are not available.

7. As the arrangement of allowing Government Veterinary Surgeons to attend to private cases is intended purely for the benefit of farmers and stock-owners who may wish to obtain professional advice, no responsibility whatever will be accepted for any loss of stock, etc., which may result from the negligent treatment or advice, or wilful default, of any Government Veterinary Surgeon.

8. All fees collected in terms of these Regulations are payable to the Treasury through the local Receiver of Revenue.

Sale of Dip

With a view to enabling farmers to obtain dipping material at as low a rate as possible arrangements have been made whereby orders may be placed with any officer of the Veterinary Department for the purchase of supplies of Messrs. W. Cooper & Nephew's cattle dipping fluid, adapted for three-day, five-day or less frequent dipping. The price of the dip is 48s. 6d. per 10 gallons, in not less quantities than that amount, delivered at any siding or station desired. Applications must be accompanied by remittances, without which they cannot receive attention. Coin or stamps will not be accepted. This dip is in use at all Government dipping tanks.

Dipping Tanks—Grants in Aid

The Government is prepared to assist farmers in the construction of private dipping tanks by a grant in aid on the £ for £ principle, but not to exceed, however, a total sum of £50.

This grant will only be paid to approved applicants, and after the tank has been inspected by an official appointed for this purpose and found suitable, and on production of receipted accounts in support of their claim.

Applications cannot be considered for grants in aid of tanks already constructed, and those wishing to avail themselves of this assistance should apply beforehand to the Director of Agriculture, from whom full particulars, together with plans and specifications, can be obtained.

Sale of Virus

It is notified for public information that redwater and gall-sickness (*anaplasmosis*) virus may be obtained from the Veterinary Department, Salisbury, at a charge of ten shillings per dose.

Solutions of trypan blue and the injection used in the treatment of *trypanosomiasis* (fly disease) of cattle may also be obtained at a charge of five shillings per dose and blue tongue virus at one shilling and sixpence per dozen doses.

No material will be issued unless a remittance accompanies the order.

Irrigation

From the Agricultural Engineer assistance may be obtained by farmers for the following :—

1. In the locating of possible irrigation projects.
2. In the preparation of surveys or plans and for irrigation works, including weirs, dams, furrows, pumping plants, and determining the extent of land which

may be brought under irrigation schemes, together with rough estimates of costs.

3. In the supervision of construction and carrying out of projects.
4. In the selection of suitable sites for boring operations.
5. Preparing specifications, etc., regarding pumping plants, windmills, and agricultural machinery.
6. Giving general advice on cognate subjects.

Informal advice of a general character will be given to applicants making enquiry by letter or in person. Any applicant desiring professional assistance likely to occupy more than one day should apply for advice in writing. All applicants should specify clearly the nature of the project on which they seek advice, and should give full particulars as to the distance and direction of their farms from some well-known centre. Applicants will be required to provide suitable means of transport for the officer concerned during the period devoted to work on the spot; to provide any unskilled labour that may be required; and to provide for any other contingent services. Applications should be addressed to the Director of Agriculture, who will endeavour to arrange visits as far as possible in order of application, but with due regard to situation, in order to obviate unnecessary travelling and delay. The services of the Agricultural Engineer are given free, but in cases demanding prolonged individual attention, or repeated supervision, a charge may be made according to circumstances.

Samples

In connection with enquiries, especially with regard to diseases amongst crops, insect pests, soils, grain and the identification of plants, specimens should, wherever possible, be sent, together with full details. It is found that such parcels are often forwarded without any indication of where they are from or why they were sent and it is difficult in such cases to trace the sender. It is, therefore, requested that persons when forwarding samples for examination, indicate clearly their names and address on the package, so as to enable their requirements to be attended to without delay.

Charges for Dipping Cattle at Government Dipping Tanks.

On and after the 1st November, 1912, a charge of 1d. per head will be made in respect of all cattle dipped at Government dipping tanks.

Unweaned calves will be dipped free of charge.

Payment may be made in cash or by means of books of coupons at £1, 10/- and 2/6, which can be obtained from Civil Commissioners, Native Commissioners, or through all Veterinary Surgeons and Cattle Inspectors.

The tanks to which these provisions at present apply are the following :—

Salisbury (3), Bulawayo (3), Inyati, Umtali, Penhalonga, Melssetter, Marandellas, Macheke, Mazoe, Lomagundi, Hartley, Gwelo, Selukwe, Enkeldoorn, Victoria, Gwanda, Gatooma, Que Que, Umvuma, Kimberley Reefs.

Destruction of Wild Carnivora, etc.

1. It is hereby notified for public information that rewards for the destruction of wild carnivora, etc., will be paid on the scale and conditions herein set forth.

2. Rewards will be paid as follows :—

For each lion	£5	0	0
For each leopard	1	0	0
For each cheetah	1	0	0
For each hyæna... ..	0	10	0
For each wild dog... ..	0	10	0
For each baboon	0	2	6
For each crocodile not less than 3 feet in length	0	10	0
For each crocodile over 1 and less than 3 feet in length ...	0	2	0
For each crocodile under 1 foot in length	0	0	6
For each crocodile egg	0	0	6

3. Rewards will be paid to Europeans by the Magistrate or Native Commissioner, of the district, within three months of the date upon which the animal is killed, on a solemn declaration on the prescribed form.

4. In proof of destruction, applicants for rewards will be required to produce and surrender in the case of a leopard or cheetah the skin with the tail unsevered, and in the case of a hyæna, crocodile, wild dog or baboon the unskinned head. In the case of a lion to produce the skin and skull, the skull only to be surrendered.

5. The skins and heads surrendered for rewards shall become the property of the Government and shall be disposed of in such manner as may be decided on.

Lectures for Farmers

The services of certain of the officers of the Department of Agriculture and the Veterinary Department are available for purposes of delivering lectures on subjects upon which they have special knowledge. As far as practicable, lectures will be accompanied by demonstrations at the time or subsequently in the field. Owing to the many calls on the time of the staff and the exigencies of their duties, alternative dates are desirable in order to avoid disappointment. The following topics are offered as examples of subjects that may be dealt with in this manner, but the suggestion of other themes is invited.

Agriculture.—Maize growing; Maize selection and maintenance of the breeding plot; Points of maize and maize judging, with demonstrations; Utilisation of granite vlei soils; Ground nut culture; Rotation crops for home use and for sale; Veld improvement by winter grasses; Production of foodstuffs for the mines; Ensilage; Fungoid diseases of maize and wheat; Wheat, oats and lucerne under irrigation; The prospects of cotton culture in Southern Rhodesia.

Veterinary Hygiene.—Detection and prevention of disease; The care of live stock.

Live Stock.—Judging of cattle according to breeds, and for beef, milk and draught; feeding and kraaling of live stock; general principles of cattle breeding; management of imported stock; grading up of native or local stock with pure bred bulls.

Dairying.—Home butter-making; building and equipment of a farm dairy; handling and marketing of milk; packing and marketing of butter; construction of cow houses.

Swine Husbandry.—Breeding and feeding of swine; some suggestions for the production of first-class bacon pigs; construction of piggeries at moderate cost.

Chemistry.—The principles of soil fertility; the principles of manuring; the value of lime in agriculture; chemistry of milk and its products (accompanied by demonstrations in milk-testing).

Entomology.—Economic entomology on the farm; the role of insects and their allies in the transmission of disease; scale insects and fruit trees and methods for their control; insect pests and maize; enemies of the potato, insect and fungus; the value and objects of plant import and nursery regulations.

Irrigation.—Methods of applying water to land for irrigation; the measurement of water in connection with irrigation; canal irrigation; storage reservoirs; hints on the selection of sites and on the design of earthen and other dams; irrigation by pumping, with notes on the selection of plants.

Enquiries and invitations should in the first instance be addressed to the Director of Agriculture, Salisbury.

Co-operative Experiments—Winter Cereal Crops

The free distribution of seed of winter cereal crops for trial under irrigation or on naturally moist land will commence about the end of February. The seed is issued free of charge on rail, Salisbury, and farmers taking part in the experiments are required to furnish, at the close of the growing season, on forms supplied for this purpose, an accurate and complete report on the result of the experiments. In the event of any applicant who has received seed failing to comply with these conditions his name will be removed from the list of those eligible to receive co-operative seeds in the future.

It is anticipated that the undermentioned varieties will be available for distribution, but since supplies of seed will be limited, early application is advisable, and no guarantee can be given that one particular variety asked for will be forthcoming. As far as possible applications will be dealt with in the order in which they are received. Not more than four varieties of seed in all can be supplied to each applicant.

Wheats	{	Early Gluyas
		Bobs
		Els
		Holstrooi
Oats	{	Algerian
		Garton's New Zealand
		Texas
		Smyrna
Barley	{	Sidonian
		Chevalier (malting)
Early Rye	{	Nepal (feed)

All applications to be addressed to the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, and full particulars to be given regarding the address to which it is desired seed should be consigned.

The following Bulletins, consisting of reprints of articles which have appeared in this Journal, are available for distribution free of charge to applicants in Rhodesia :—

- No. 2. The Possibilities of Rhodesia as a Citrus Growing Country, by R. McIlwaine, M.A., LL.B.
- No. 81. Possibilities of Export Trade in Oil Seeds, by H. Godfrey Mundy, F.L.S.
- No. 61. Requirements in sending Botanical Specimens to the Department for Identification.
- No. 71. Report of Forestry in Southern Rhodesia, by J. Sims, F.H.A.S.
- No. 78. Hints on Irrigation—Small Gravitation Schemes—Pipes and Pipe Laying—by W. Martin Watt, Government Agricultural Engineer.
- No. 68. Fertility of Soils and Organic Matter, by G. N. Blackshaw, B.Sc., F.C.S., Government Agricultural Chemist.
- No. 79. Winter Cereals, by H. Godfrey Mundy, F.L.S.
- No. 99. Bean Crops, by H. Godfrey Mundy, F.L.S.
- No. 125. Subterranean Water, by W. M. Watt.

No. 55.	How Maize can be made more profitable, by H. Godfrey Mundy, F.L.S.
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- No. 14. Bots in Equines, by R. Ferguson Stirling, M.R.C.V.S.
 - No. 54. African Coast Fever, by Ll. E. W. Bevan, M.R.C.V.S. (revised edition).
 - No. 51. Strangles, by F. D. Ferguson, M.R.C.V.S.
 - No. 113. Anaplasmoses of Cattle, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 114. Anaplasmosis of Sheep, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 117. Ephemeral Fever or Three Days' Sickness in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 118. Preparation of Blood Smears.
 - No. 121. Rabies, by Ll. E. W. Bevan, M.R.C.V.S., and T. G. Millington, M.R.C.V.S., D.V.H.
 - No. 49. Notes on Bovine Plasmoses of Southern Rhodesia, with special reference to Mashonaland, by Ll. E. W. Bevan, M.R.C.V.S.
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- No. 90. Reports on Experiments—Experimental Station, Salisbury, 1910-1911, by J. H. Hampton.
- No. 10. Watering and Feeding of Live Stock on Railway.
- No. 93. Formation of Agricultural Credit Associations in Rhodesia, by Loudon M. Douglas, F.R.S.E.
- No. 96. Swine Breeds and Breeding of, by Loudon M. Douglas, F.R.S.E.
- No. 98. Pig Breeding and Feeding, by T. M. Rixon.
- No. 104. Stock Raising, by Otto Zimmerman.
- No. 105. Bacon Curing on the Farm, by Loudon M. Douglas, F.R.S.E.
Dipping Tanks—Grants in Aid.
Forestry—Sale of Seedling Trees.
- No. 110. Utility Poultry Keeping, for Amateurs and Beginners, by "Gallinule."
- No. 119. Some Notes on Charcoal Burning, by Eric A. Nobbs, Ph.D., B.Sc.
- No. 122. Notes on the Management of Dairy Herds, by R. C. Simmons.
- No. 123. Feeding and Care of Imported Bulls, by R. C. Simmons.
- No. 124. The Manuring of Maize on the Government Experiment Farm, Gwebi, 1912.
- No. 127. Notes on the Building of Farm Homesteads, by R. C. Simmons.
- No. 129. How to Make Use of the "Fencing Ordinance, 1904," by N. H. Chataway.
Health and Clothing.
Malaria : its History, Prevention and Cure, by A. M. Fleming, C.M.G., M.B., F.R.C.S. (Ed.), D.P.H. (Camb.), Medical Director.
- No. 131. Notes on Cattle Breeding, Part I. The Shorthorn, by R. C. Simmons.
- No. 134. Plans and Specifications for Flue Curing Tobacco Barns.

Employment on Farms.

The Department of Agriculture receives numerous enquiries from persons of varied attainments, age and financial position for openings on farms, as managers, assistants and learners, requiring remuneration on corresponding scales, or willing to give services in return for keep.

In order that work may be found for the above and needs of farmers met, applications are invited from both employers and persons seeking employment. Applications are also invited from artisans, such as masons, bricklayers, carpenters, fencers, well sinkers, concrete workers, and the like who may desire work on farms. In cases where employers have obtained the labour they require, or applicants for employment have found work, it is requested that notification be at once sent to the Department of Agriculture, in order that unnecessary correspondence be avoided.

Replies to the following applications should be addressed to the initials of the advertisers, c/o Director of Agriculture, who will forward the letter to the party referred to.

SITUATIONS VACANT.

T. H. D.—General agriculturist, who must understand cattle. Small salary and board, with share of profits.

C. C. T.—Tobacco grower, experienced in growing and curing (open air) tobacco. Employer supplies land properly worked, implements, etc., on half shares.

F. A. W. has vacancy for farming pupil, who must pay for board.

SITUATIONS WANTED.

J. J. R. and R. W. F.—Understand farming in all its branches; long experience. Prepared to work on shares.

S. P. L.—General knowledge of farming in all branches. Six years' farming in Melsetter district, agricultural and stock. Married; no children.

J. E.—As manager or assistant. A little Home experience.

J. B.—Would like to work on shares. Seven years' experience of general farming in Cape Province.

H. B.—As farm manager. Trained at Elsenberg Agricultural College; experience in stock and dairy management, sheep, horses and cattle.

G. B.—Would like to work on shares. Four years' experience of general farming in Colesberg district, Cape Colony.

J. M.—Knowledge of stock; considerable experience with cattle in Australia.

G. L.—Assistant on farm. One year farming in Transvaal. Brought up on farm in Cape Province. Wages £3 to £5 per month, with board and lodging.

K. S.—Wishes to obtain experience on general or tobacco farm.

J. B. H.—Requires employment on tobacco farm.

J. G.—Understands horses, cattle and agriculture. Married; wife understands poultry. Would like to get on farm where he can also cultivate and keep stock for himself.

E. D. P.—Tobacco growing. One year's experience. £3 per month, and board.

P. W. P. and J. J. R.—Services in return for small salary or interest in farm. Thorough knowledge of farming in Cape Province and Free State.

B. O. M.—Would like to get on tobacco farm to gain experience.

C. J. S.—Twenty-five years of age. Six years' farming experience in Cape Province. Would like to work a farm on percentage of profits.

P. M. W.—Prefers dairy farming; wife understands butter making and poultry. Recommended by Chairman, O.F.S. Land Settlement.

A. E. B.—Three years' experience in mixed farming in Rhodesia. Requires position as assistant on mixed farm or ranch.

P. S. B. G.—Experienced in general farming, including vegetable and tobacco growing. Married; wife can make butter and accustomed to farm life.

C. F. G.—Experienced in general farming, including tobacco; capable of managing a farm. Married, one child.

L. G.—Understands general farming; would like employment as manager on ranch.

H. F. L.—No experience. Board and lodging in return for services.

S. O. M.—Employment on tobacco farm. Experienced in dealing with natives.

N. M.—Practical farming experience in Devonshire, and ten months in Rhodesia; age 26.

W. M.—Requires employment as manager of cattle ranch or mixed farm. Twelve years' experience in South Africa. Age 35, single.

J. O. W.—Colonial farmer; 25 years' experience general farming.

Government Notices.

ANIMALS DISEASES AMENDING ORDINANCE, 1911.

Ordinance No. 2, 1911.]

[Promulgated 17th March, 1911.

BE IT ENACTED by the Administrator of Southern Rhodesia, with the advice and consent of the Legislative Council thereof, as follows:—

1. So much of the "Animals Diseases Consolidation Ordinance, 1904" (hereinafter referred to as the said Ordinance) and of any other law as may be repugnant to or inconsistent with the provisions of this Ordinance is hereby repealed.

2. The Administrator may, on the outbreak of a destructive disease, or when there is suspicion of the existence of such disease, declare an area around and including the place where such disease exists, or is supposed to exist, actively infected for the purpose of this Ordinance.

3. Whenever an area shall have been declared infected in terms of the last preceding section, the Administrator may, for the purpose of suppressing or controlling disease, cause such fences to be erected along the boundaries of or across any farms or land situated in such area as he may deem necessary.

4. (1) If the landowner shall not pay the cost of erecting any fence as aforesaid upon completion thereof, the cost shall be defrayed in the first instance out of moneys provided by the Legislative Council.

(2) When any fence erected as aforesaid runs along the boundary of a farm, the cost of the erection of such fence shall, if not sooner repaid, be repaid, together with interest at the rate of £5 per centum per annum, by equal yearly instalments commencing two years after the fencing is completed, such instalments being so calculated and fixed that the said cost and interest shall be wholly repaid within a period of fifteen years from the date when the first instalment became due.

(3) Such repayment shall be made by the adjoining landowners whose land has been divided by the fence. Each such landowner shall pay one-half the cost of the dividing fence and interest as aforesaid. When the adjoining land is a native reserve, or a portion of such reserve, the one-half of the cost shall be paid from funds in the local Treasury of the British South Africa Company.

(4) When any fence as aforesaid shall be erected within, and not on and along, the boundaries of any farm, the cost shall be paid from the funds of the local Treasury of the British South Africa Company, and the fence when no longer necessary for the purpose for which it was erected may be removed by the British South Africa Company; provided that the landowner shall have the right to purchase such internal fence at a price representing the total cost of such fence.

(5) The term "owner" shall mean (a) the person registered as such in the office of the Registrar of Deeds, (b) the British South Africa Company in respect of native reserves, and (c) the local authority in respect of municipalities.

5. Where the bed of a stream or river lies immediately between or constitutes the boundaries of land owned by private owners, the fence may be erected on one or other bank of the river or stream and across it, or partly

on one bank, across it, and partly on the other bank, in such manner as may be agreed upon by the owners whose lands are separated by the said stream or river. The Administrator may call upon the said owners to agree to the position of the said fence on or before a date fixed by him, and, should they fail to do so, he may cause such fence to be erected without further reference to the said owners. For the purposes of repayment, such fence shall be considered as dividing the lands of adjoining owners, and half the cost shall be recoverable from each owner whose lands are separated by the said stream or river.

6. The Administrator may call upon any owner whose land has been fenced in terms of section 3 or 12 to provide sufficient security for the payment of any sums that may be due to the British South Africa Company in its local Treasury in respect of such fence. If the owner shall fail or refuse to provide such security, the Administrator may cause a notice in writing to be sent to the Registrar of Deeds of the amount due by such owner, and the Registrar shall make an entry thereof in respect of the land fenced. Such entry shall constitute an hypothecation of the land, ranking from the date on which the entry was made and for the amount therein stated; provided that the Registrar may pass transfer of land so hypothecated if the transferee agrees in writing that any sums due and unpaid shall remain and be registered as a charge against the said land.

7. When any land held under lease or permit of occupation has been fenced in terms of this Ordinance, during the term of such lease or permit the lessee or permit holder shall pay to the proprietor of such land yearly, during the continuance of the lease or permit of occupation, interest at the rate of £5 per centum upon so much of the cost of the fence as the proprietor is liable for, and such payment shall be made with the rent of the land, and shall be deemed in law to be part of such rent.

8. Any tenant or holder of land under a permit of occupation having a right to purchase such land at a fixed price shall, on completion of the purchase, pay to the proprietor, in augmentation and as part of the purchase money, any sum paid by such proprietor for the fencing of such land, and shall become and be liable to repay to the British South Africa Company in its local Treasury such sums as remain unpaid, as the same become due and payable in terms of this Ordinance.

9. Where in the case of any local authority the title to land provides that upon the sale thereof the British South Africa Company shall be entitled to receive a proportion of the purchase price, the local authority shall be entitled to deduct from the purchase price of land sold any debt due or amount paid by it in respect of fences on the land so sold erected under this Ordinance.

10. The provisions of sections 14 and 15 of the "Fencing Ordinance, 1904," in regard to repairs shall, *mutatis mutandis*, apply to fences erected in terms of this Ordinance.

11. Where a fence crosses any road used as of right by the public or by any neighbouring landowner, a properly constructed swing gate shall be placed at the point of crossing.

12. Any person opening such gate, except for the purpose of passing through, or omitting to close such gate after having passed through, and any person damaging such gate and omitting to immediately repair such damage shall be liable to a fine not exceeding £10, or in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

13. The Administrator may, for the purpose of the more effective prevention or control of disease, apply the provisions of this Ordinance in respect of fencing to municipalities and townships and such land adjoining as may be deemed expedient, and to places within a radius of ten miles of an area declared actively infected in terms of section 2 hereof, if, owing to the number of cattle in such places, or other causes, it appears expedient.

14. (1) The owner or proprietor of the land along the boundaries of which fences have already been erected by the British South Africa Company for the purpose of preventing the spread of

African Coast Fever in cattle shall be and is liable to repay to the British South Africa Company in its local Treasury one-half of the cost of so much of the fence as may be along the boundary of such land. The provisions of sections 7 and 8 of this Ordinance shall apply in the case of land held under lease or permit of occupation along the boundaries of which fences have already been erected. The British South Africa Company may remove any such fence already erected which is within and not on or along the boundaries of any land when no longer necessary for the purposes for which it was erected.

- (2) Any payment due in respect of any such fence may be made as provided by section 4 of this Ordinance, and under the like conditions as to security for such payment as are prescribed under section 6.

15. Within any area declared by the Administrator to be actively infected under the provisions of section 2, or to which the provisions of this Ordinance shall have been applied in terms of section 12, the Administrator may for the purpose of more effectively preventing the spread of disease cause to be constructed on any land a dipping tank and any structures incidental thereto or other appliances for the dipping of stock, and may recover the expenditure incurred from the owner of the land on which such tank, structures or appliances have been constructed. The cost of such tank, structures or appliances shall be paid on the same terms and under the same conditions as are applicable to boundary fences under sections 4, 6, 7 and 8 of this Ordinance.

16. In addition to any penalties that may be imposed under the said Ordinance or any amendment thereof, or under any regulations framed thereunder for the unlawful movement of cattle, the Court of the Magistrate before which the case is tried or the High Court in the like instance may direct the confiscation of any cattle unlawfully removed, and such cattle, if infected with disease or likely to convey infection, shall be destroyed without compensation. Should there be no danger of infection the Administrator may order such cattle to be temporarily kept at any spot denoted by him and then sold. The proceeds of any such sale shall be paid to the British South Africa Company in its local Treasury.

17. Section 11, sub-section (1) of the said Ordinance is hereby repealed, and in lieu thereof the following shall be the section :—

“Should any Inspector, Sub-Inspector or any person specially authorised by the Administrator to carry out the provisions of this Ordinance know or suspect that any animal is infected with any destructive disease such Inspector, Sub-Inspector or other authorised person may forthwith place such animal in quarantine, together with such land as is necessary for its isolation, and such animals as have been or are suspected of having been in contact with such animal or with infection. Notice of such quarantine shall be given in writing to the owner or custodian of such animal and to the Magistrate of the district, and shall remain in force for such time as the Chief Inspector or Controller of Stock may direct, unless the Administrator shall sooner, if he thinks fit, issue the notice referred to in sub-section (2) of section 5. A copy of the notice of any such quarantine shall be posted at the office of the Magistrate, and shall be inserted by the Magistrate in some newspaper, if any, circulating in the district.”

18. Section 16 of the said Ordinance is hereby repealed, and in lieu thereof the following shall be the section :—

“Any Government Veterinary Surgeon or any person thereto authorised by the Controller of Stock, Chief Inspector or by a Magistrate may enter any land, building, kraal or enclosure for the purpose of inspecting animals. Should any animal be found to be infected with any destructive disease, or should such infection be reasonably suspected, he may quarantine such animals as in this

Ordinance provided, and may order the proper disinfection of any building, kraal or enclosure in which such animal is or may recently have been, and the furniture and fittings thereof. Should it be impossible to properly disinfect such stable, kraal or enclosure, furniture or fittings in any of them, he may order the destruction thereof; provided that no building, kraal or enclosure shall be destroyed unless the owner consents thereto in writing, or failing such consent, the Administrator orders that such destruction be carried out."

19. Section 22, sub-section (1) of the said Ordinance is hereby amended by the addition of the following words after the word "obtained" in the twelfth line of the said sub-section, "and any person receiving or taking delivery of any animals without having ascertained that such permit has been obtained."

20. This Ordinance may be cited as the "Animals Diseases Amending Ordinance, 1911," and shall be read as one with the "Animals Diseases Consolidation Ordinance, 1904," and the "Animals Diseases Amendment Ordinance, 1910."

No. 189 of 1912.]

[6th June, 1912.

ANIMALS DISEASES CONSOLIDATION ORDINANCE, 1904.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that, notwithstanding the provisions of section 12 of Government Notice No. 50 of 1912, the removal of cattle for purpose of obtaining food or water may be permitted at the discretion of the Chief Inspector, and under such conditions as he may prescribe.

No. 216 of 1912.]

[4th July, 1912.

REMOVAL OF CATTLE TO PRESCRIBED AREAS.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that, notwithstanding the provisions of Government Notices Nos. 47 and 254 of 1910 and 51 of 1911 the removal of cattle to any point within twenty miles of the border of the territory defined by the Crocodile, Shashi and Ramaquabane Rivers, to the south-east beacon of Mphoeng's extension on the last named, may be allowed until further notice under permit from the Chief Inspector for the purposes of grazing and watering.

No. 361 of 1912.]

[21st November, 1912.

ANIMALS DISEASES CONSOLIDATION ORDINANCE, 1904.

WHEREAS it is necessary to afford facilities for transport with cattle between the Iron Mine Hill Siding area and the Umvuma Siding area as described in the Schedule to Government Notice No. 11 of 1912. I, under and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," do hereby cancel Government Notices Nos. 345 and 347 of 1912, and, notwithstanding any regulations to the contrary, declare that the above-mentioned areas shall be regarded as one for the purposes of working draught cattle for a period of three months from date hereof.

No. 50 of 1912.]

[8th February, 1912.

AFRICAN COAST FEVER.

Regulations regarding the movement of cattle and the prevention and suppression of disease.

1. UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notices Nos. 329 of 1910 and 308 of 1911 and make the following provisions in lieu thereof :—

2. The various districts of Southern Rhodesia are hereby declared an area infected with African Coast Fever for the purposes of section 5 (2) of the aforesaid Ordinance, and, save as hereinafter set out, all movement of cattle within the said districts is prohibited until further notice.

General Movement.

3. For the purpose of section 22 (1) of the said Ordinance, the following shall be regarded as places within the boundaries of which the movement of cattle may be allowed without special permission :—

- (a) Single farm.
- (b) Two or more adjoining farms, farmed together under one management and situated within one cattle transport area.
- (c) An area, the property of one owner, enclosed by a substantial fence.
- (d) For grazing purposes, an area within a radius of four miles of native kraals situated on unalienated land or in reserves, save and in so far as such area includes any private land.

The sites of such kraals shall be deemed to be the places where they are situated at the date of promulgation of these regulations.

4. Notwithstanding the provisions of the last preceding section, or of section 9 hereof, the Chief Inspector may, on the outbreak of disease, or for such other cause as may be deemed expedient, direct the isolation or quarantine of cattle on a limited area of the aforesaid places.

5. The movement of cattle from place to place may be permitted under the special permission, in writing, of an Inspector, Sub-Inspector, or other officer or person duly authorised by the Administrator to grant such permission.

6. No permission as aforesaid shall permit the movement of cattle—

- (a) Without the written consent of the owners, occupiers or managers of occupied land, and in the case of native reserves, of the Native Commissioner of the district over which land or reserve such cattle will pass, whether along roads or otherwise; provided, however, that refusal to grant such consent shall be in writing, and provided further that if the Controller of Stock or the Chief Inspector shall consider that such consent is withheld without good and sufficient cause he may permit of movement without such consent.

If any such person mentioned above refuse to give consent or to state a reason for refusing to do so in writing, no valid objection shall be deemed to exist and movement may be permitted without such written consent.

- (b) Within a veterinary district as defined in the Schedule annexed hereto from one transport area to or through another without the consent of the Cattle Inspector in charge of such area.
- (c) From any veterinary district to or through another without the consent of the District Veterinary Surgeon of such district.

Slaughter Cattle.

7. Cattle moved to any centre for slaughter under the provisions of these or any other regulations shall, on arrival, be immediately taken to such quarantine area (if any) as is provided for the purpose and immediately branded with the letters "V.D." on the near hip.

8. Cattle admitted to a quarantine area in terms of the last preceding section shall be slaughtered within twenty-one days of the date of admission, and shall not be permitted to leave the same except for the purpose of being

slaughtered at the appointed abattoir, and if found outside such area, except for the said purpose, may be destroyed on the order of the Chief Inspector or Controller of Stock; provided, however, that the Chief Inspector may allow the removal of cattle from such an area under such conditions as he may prescribe.

Transport Cattle.

9. The use of cattle for draught purposes is prohibited except :—
 - (1) Within the boundaries of the places defined in section 3 (a), (b) and (c) hereof.
 - (2) Within the boundaries of areas already fixed for the use of cattle for draught purposes in terms of regulations published under Government Notice No. 329 of 1910, or such other areas as may be fixed by the Administrator.
10. Notwithstanding the provisions of section 9, no permit shall authorise the working of cattle
 - (a) which are not clearly and distinctly branded with the registered brand of the owner;
 - (b) in any wagon or vehicle which shall not have the owner's name and address legibly and permanently inscribed on the right side thereof.
11. No wagon or other vehicle drawn by oxen shall be moved from one cattle transport area into another without the permission of the Cattle Inspectors concerned, and under such conditions as they may impose.

General Provisions.

12. On the outbreak or suspected outbreak of disease, the Administrator may declare an area of infection around and embracing the place of outbreak or suspected outbreak, and a further area or areas around such area of infection as a guard area, whereupon all movement of cattle into and from place to place within such area or areas shall be immediately suspended, except as hereinafter provided.

A.—In areas of infection and guard areas:—

- (1) Cattle in transit by rail may be moved through such area.
- (2) Cattle from beyond the borders of Southern Rhodesia may be detained within such area or areas *en route* to destination.
- (3) Cattle for *bona fide* farming, dairy and slaughter purposes may be moved into such area or areas by permission of the Chief Inspector and under such conditions as he may impose.

B.—In guard areas only:—

Cattle may be moved into and from place to place within such area under the conditions of section 6 hereof.

13. The removal of green forage, hay, fodder, bedding reeds, manure or of such other articles as may be reasonably supposed capable of conveying infection, shall be prohibited from areas of infection, save and except with the special permission of the Administrator.

14. Whenever an area shall have been declared under section 12 hereof, every person within such area, or within such further area as may be specified by Government Notice, owning or in charge of cattle shall, upon the death or slaughter because of disease, suspected disease, or accident, of any such cattle, immediately report such occurrence through the nearest Cattle Inspector, Native Commissioner or Police Officer to the District Veterinary Surgeon.

15. Notwithstanding the provisions of these regulations, it shall be competent for the Chief Inspector of Cattle to authorise and direct the movement of cattle for the purposes of isolating, dipping, quarantine, or any other such objects as may be deemed necessary to prevent or suppress an outbreak of disease.

16. Whenever an area shall have been declared an area of infection or guard area in terms of section 12 hereof, any person who shall allow any cattle to stray or be otherwise removed, except as provided for in these regulations, from any one place within such area to another place, or from a place outside of to a place within such area, shall be guilty of an offence against these regulations.

17. All cattle within the limits of the various commonages and townlands, areas of infection and guard areas as declared under section 12 hereof, or depastured on common grazing ground, shall be dipped or sprayed at least once in every three days, unless the Chief Inspector shall authorise the extension of the time between such dipping or spraying, or the entire suspension of the same.

18. In all areas of infection and guard areas sheep and goats shall be dipped at such periods as may be directed by the Chief Inspector.

19. Whenever the owner, occupier, or manager of a farm shall adopt means of cleansing cattle running thereon, either by spraying, dipping, or by any other method, the Chief Inspector may order any natives or other persons having cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district within which the farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

20. All permits for the removal of cattle issued under the provisions of the said Ordinance or of any regulations framed thereunder shall specify legibly and clearly on the face thereof the place from and to which such cattle may be removed, the route by which they shall travel, the number and brands of such cattle, the time allowed for the journey, and such other particulars and conditions as it may be deemed expedient to provide.

21. No permit issued for the movement of cattle shall be taken to authorise any trespass in connection with such movement.

22. Notwithstanding the provisions of these regulations, it shall not be lawful for any owner of cattle to allow any such cattle to be on any road, public outspan, commonage, or any property other than that of the owner, unless they are free from ticks or unless they have been effectively cleansed by dipping, spraying or other process, within fourteen days of being allowed on such road or other place. Any beast having ten or more ticks on it shall not be considered free from ticks.

23. Any person contravening the provisions of these regulations or the conditions set out in permits issued thereunder, shall, where no higher penalty has been by the said Ordinance or any other law provided, be liable in respect of each offence to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months.

SCHEDULE "A."

VETERINARY DISTRICTS OF SOUTHERN RHODESIA.

(1) *Salisbury.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912:—

32. Battlefields; 33. Hartley and Gatooma; 34. Gadzema Station; 35. Makwiro Station; 36. Norton Siding; 37. Hunyani Tank; 38. 1645½ Peg B. & M. & R. Railways; 39. Salisbury A.; 40. Salisbury B.; 41. Salisbury C.; 42. Salisbury D.; 43. Arcturus; 44. Bromley; 45. Marandellas North; 46. Marandellas South; 48. Headlands Station; 49. Junction Mazoe and Lomagundi Railways; 50. 23-Mile Peg, Lomagundi Railway; 51. Passaford Station; 52. 35-Mile Peg, Lomagundi Railway; 53. Gwibi Tank Halt; 54. Banket, Lomagundi; 55. Eldorado, Lomagundi; 56. Selby Siding; 57. Mazoe; and 59. Kimberley Reefs.

(2) *Bulawayo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

1. Plumtree; 2. Marula Siding; 3. Figtree; 4. Westacre Junction; 5. Bulawayo Area; 6. Heaney Junction; 7. Bembesi Station; 8. Insiza North; 9. Insiza South; 10. Shangani North; 11. Shangani South; 14. Redbank; 15. Nyamandhlovu Station; 16. Malindi Station; 17. Wankies Area; 18. Matetsi Siding; 19. Matopo Terminus; 20. Sabiwa Siding; 21. Gwanda Station; 22. West Nicholson; 23. Belingwe; 59. Essexvale and Balla Balla Areas; 60. Stanmore Siding Area; 61. Filabusi Area.

(3) *Gwelo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

12. Somabula Siding; 13. Gwelo Station; 24. Selukwe Area; 25. Surprise Area; 26. Indiva Siding; 27. Lalapanzi; 28. Iron Mine Hill Siding; 29. Umvuma Siding; 31. Que Que Station.

(4) *Umtali.*

An area comprising the native districts of Umtali, Melsetter, Makoni and Inyanga.

No. 175 of 1912.]

[30th May, 1912.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that, notwithstanding the provisions of Government Notices Nos. 47 and 254 of 1910 (and 51 of 1911), the removal of cattle to within that portion of the prescribed areas westward of the Salt River, Tuli district, may be allowed under permit from the Chief Inspector, for the purposes of grazing and watering.

No. 233 of 1912.]

[11th July, 1912.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notice No. 127 of 1910, in so far as it relates to the Protectorate of Nyasaland, and further do hereby prohibit the introduction into Southern Rhodesia of cattle from Nyasaland until further notice.

No. 252 of 1912.]

[1st August, 1912.

AFRICAN COAST FEVER. TRANSPORT AREAS.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 9 of the regulations published under Government Notice No. 50 of 1912, declare the areas described in the subjoined Schedule as areas within which the use of cattle for draught purposes may be permitted.

SCHEDULE.

62. *Mazi Siding.*

An area including the farms Cheronga, Highfield, Kirbyvale, Mona, Dyffryn, Maidstone, Harrisonville, Recondite and Crofton.

63. *Inyazura Siding.*

An area bounded by and including the following farms :—Inyanapam-beri Outspan, Tiny, Marngu, Mount Zonga Commonage, Mount Zonga, Kwapassi Outspan, Orowati, Tableview, Tsungwesi Source, Tsungwesi Ridge, Everton, and the unsurveyed land lying east of a line drawn from the north-west beacon of Everton to the south-west beacon of Tiny.

64. Igusi Siding.

An area bounded by and including the following:—Winter, Spring, Eland, Buda Block No. 2, Grant, Batley, Groote Schuur No. 2, Frankland, Fry's Farm, Goshen Flat, Uhlanulu, Ubusiga, Ughwindhla, Ihlobo, Woodlands, Teakdale, Barn Park, Forest Hill, Groote Schuur, Majindan, Mvuba, Barwon, Campaspe, Esperanza, Merryland and Maraposa.

65. Gwaai Area.

An area bounded by the Malinda area, the Bechuanaland border, the Plumtree, Nyamandhlovu, Igusi Siding, Bembesi, Shangani North and Gwelo areas, from the most northerly point of the latter down the Shangani River to the western boundary of the Shangani Reserve, thence in a southerly direction along the same to the Gwampa River and down this river to the Malinda area.

No. 338 of 1912.]

[24th October, 1912.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notice No. 213 of 1912, and, in terms of section 12 of Government Notice No. 50 of 1912, declare the following areas of infection and guard areas for the purposes of the said Ordinance:—

(1) NATIVE DISTRICTS OF UMZINGWANE, BULAWAYO, MATOBO AND BUBI.

(a) Areas of Infection.

The farms Alnwick, Nyorka, Induba, Collaton, Irene, Maboqutwaneni Outspan, that portion of the Essexvale Estate, known as the North Paddock, which adjoins the farm Ballarat on its eastern boundary, and the fenced subdivision of Bulawayo Commonage, which includes the township, suburbs and Hillside.

(b) Guard Area.

An area bounded by and including the following farms:—Lochard Block, Half Ration Ranche, Chilton, Fincham's, Inyati Reserve, Huntsman, Robert Block, Induna, Waterfall, Dingaan, Rouxdale, Fundisi, Helenvale (excluding farms Nos. 1, 3 and 16), Slights, Bilars, Stonycroft, Craiglee, Blewbonny, Ireland, Welcome, Springvale, Vriegezicht, Paul's Rest, McGeer's Luck, Centenary Mission, Outspan No. 3, Anglesea, Mineral King, World's View, Matopo Block, Mission Farm Brethren in Christ, Absent, that portion of the Matopos lying north of a line drawn from the south-eastern beacon of Absent to the north-western beacon of Longfield, The Range, Clarke's, Swaithe's, Limerick, Pioneer's Rest, Hayhill, Rietfontein, Bradford, Hamilton, Mayfair, York, Indina, Rathline, Westondale, Sub-Division "A," Fochabers, Kodhwayo, Zimbile and Lochard Outspan.

(2) NATIVE DISTRICT OF SALISBURY.

(a) Area of Infection.

Salisbury Commonage.

(b) Guard Area.

1. The farms Gillingham and Rainham.
2. The farms Avondale, Mount Pleasant, and Nursery.

(3) NATIVE DISTRICT OF UMTALI.

(a) Area of Infection.

Umtali Commonage.

(b) Guard Area.

An area bounded by and including the unsurveyed land known as Penhalonga Valley, the farms Dupris, Ferndale, Fairholme, Barrydale, from the north-western beacon of the latter along the eastern boundaries of the

Premier Estate, Mtikas and the Dairy, thence by and including the farms Wiermouth, Raheen, Fern Valley, and Fernhill to the Anglo-Portuguese boundary, thence along this boundary in a northerly direction to the first named place.

(4) NATIVE DISTRICT OF MELSETTER.

Guard Area.

The farms Tilbury and Dunstan.

(5) NATIVE DISTRICTS OF MAKONI AND INYANGA.

Guard Areas.

The Makoni Reserve and the farms Makoni Kop, Lesapi Drift, Lesapi Valley, Dombo Outspan, Inyangura, Notgotimyet, Timaru, Rodel, Liverpool, York, Foxhill, Inyangonibe and Inyanga Valley.

No. 12 of 1913.]

[9th January, 1913.

AFRICAN COAST FEVER.

WHEREAS there has been an outbreak of a destructive disease, to wit, African Coast Fever, on the farm The Grange, I, under and by virtue of the powers vested in me by the "Animals Diseases Amending Ordinance, 1911," do hereby declare the said farm and the following surrounding farms in the native district of Salisbury to be an area actively infected with African Coast Fever for the purposes of the said Ordinance:—

Teviotdale, Vainona, Pomona, Borrowdale, Glen Lorne, Springs, Stuhm, Chishawasha, Sternblick, Gletwyn, Rietfontein, Chikurubi, Mauresa, Father Hartmanns, Gardiner, Caledonia, Sebastopol, Dispute, Donnybrook, Waterworks Reserve, Green Grove, Letombo Camp, Greendale.

No. 13 of 1913.]

[9th January, 1913.

AFRICAN COAST FEVER.

I DO hereby, in terms of section 12 of the regulations published under Government Notice No. 50 of 1912, declare the following area of infection and guard area for the purposes of the said regulations:—

(a) *Area of Infection.*

The Grange farm, in the native district of Salisbury.

(b) *Guard Area.*

The following farms in the native district of Salisbury:—

Teviotdale, Vainona, Pomona, Borrowdale, Glen Lorne, Springs, Stuhm, Chishawasha, Sternblick, Gletwyn, Rietfontein, Chikurubi, Mauresa, Father Hartmanns, Gardiner, Caledonia, Sebastopol, Dispute, Donnybrook, Waterworks Reserve, Green Grove, Letombo Camp, Greendale.

No. 342 of 1912.]

[24th October, 1912.

TRANSPORT AREAS.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 9 of the Regulations published under Government Notice No. 50 of 1912, declare that, until further notice, the main road between the Tokwe and Ngesi Rivers is included in Area No. 24, Government Notice No. 11 of 1912, and the use of cattle for draught purposes is therefore permitted up to the Ngesi River upon the said road.

No. 392 of 1912.]

[19th December, 1912.

TRANSPORT AREAS.

WHEREAS it is desirable to afford facilities for a limited amount of transport with cattle from Shangani Station to the Native Commissioner's Office in the Belingwe district, I, under and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," do hereby, notwithstanding any regulations to the contrary, authorise the Chief Inspector to permit of such transport under such terms and conditions in writing as to him may seem fit.

No. 22 of 1913.]

[16th January, 1913.

MOVEMENT OF CATTLE.

IT is hereby notified for general information that, in terms of section 5 of the regulations published under Government Notice No. 50 of 1912, I do hereby authorise Native Commissioners and Assistant Native Commissioners to issue permits for the movement of cattle from place to place, in conformity with the provisions of the said regulations.

SUMMARY OF THE "GAME LAW CONSOLIDATION ORDINANCE, 1906," AND REGULATIONS ISSUED THEREUNDER.

The Ordinance divides the game into three distinct classes, described as follows :—

- (a) Birds and Small Buck.
- (b) Bushbuck, Hartebeest, Impala, Lechwe, Pookoo, Roan and Sable Antelope, Sitatunga, Tsessebe, Waterbuck, and Wildebeest.
- (c) Royal Game, which includes Eland, Elephant, Giraffe, Gemsbok, Hippopotamus, Inyala, Koodoo, Ostrich, Rhinoceros, Springbuck and Zebra.

The shooting season for Class "A" is as follows :—

In Mashonaland :

Birds from 1st May to 30th September.
Small Buck from 1st May to 31st October.

In Matabeleland :

Birds and Small Buck from 1st May to 31st October.

To shoot in Class "A" a licence costing £1 per annum is required. This entitles holders to hunt in both Provinces during the open season.

Class "B."—The season opens on 1st July and closes on 30th November in both Provinces. The licence fee is £25 for non-residents and £5 for persons having their domicile in Southern Rhodesia. This licence entitles the holder to shoot up to 15 head, which number may be increased to a total of 25 upon payment of a further sum of £15 in the one case and £5 in the other.

Class "C."—The Administrator may, if he is satisfied that the animals are actually required for scientific purposes, grant to the holder of a game licence permission to shoot or capture any of the species included in this Class. Such permit requires a £5 stamp. Applications in writing, together with proof of *bona-fides*, should be addressed to the Director of Agriculture.

Game for Farming Purposes.—Permits are granted for the capture of Eland, Ostrich, Zebra or other animals for the purposes of breeding or farming. Such permits require a stamp of the value of £1 and remain in force for six months. Application, accompanied by a sworn declaration, should be made through the Director of Agriculture or the Civil Commissioner of the district.

Game Injuring Crops.—The occupier of any cultivated land or any person acting under the authority of such occupier, may at any time destroy game actually doing damage on such land.

Elephants on Occupied Farms, Melsetter.—The destruction of Elephants when found on occupied farms on the High Veld in Melsetter District is authorised (*vide* Government Notice No. 284 of 1908).

Tsetse Fly, Hartley District.—Government Notice No. 201 of 1912 withdraws the Close Season for Class "B" until 30th June, 1913, in the area in the Hartley district bounded as follows:—From the Railway bridge on the Umfuli River, thence north-westwards along the Umfuli River to where it joins the Umniati River, thence southwards along the Umniati River to where it joins the Umsweswe River, thence eastwards along the Umsweswe River up to the drift at the Lydia Mine, thence along the old road from Lydia Mine to Etna Mine and to Inez Mine, thence northwards along the road from Inez Mine to Hartley, thence in the direction of the Railway bridge to the starting point on the Umfuli River. This notice also transfers from Class "C" to Class "B" Eland, Koodoo, and Zebra so far as that area is concerned. Under Government Notice No. 129 of 1909 game in Class "B" may be shot without a licence in this area.

Game in Class "A" may be hunted in the close season until further notice on private land in the Melsetter district by holders of a licence.

Protected Areas.—No game may be hunted or killed within the limits of the Commonage or Townlands of Bulawayo and within a radius of two miles of the Court House, Gwelo, or within the Urungwe Game Sanctuary, as defined by Government Notice No. 237 of 1906.

"Locust Birds" are strictly protected, *vide* Government Notice No. 121 of 1907.

Export of Game.—No living Game or the Eggs of any Game Birds may be exported beyond the limits of Southern Rhodesia without a written permit.

Shooting on Private Land.—A licence does not entitle the holder thereof to shoot on private land without the permission of the land-owner.

No. 243 of 1912.]

[18th July, 1912.

GAME LAW CONSOLIDATION ORDINANCE, 1906.

UNDER and by virtue of the powers vested in me by section 4 (2) of the "Game Law Consolidation Ordinance, 1906," I do hereby suspend the operation of the said Ordinance, in so far as it relates to the destruction of hippopotami, on the farms Impofhoe and Hippovale, in the district of Hartley, and in such portions of the rivers Serui and Umfuli as are contiguous to the said farms, for a period of one year from the 19th July, 1912.

No. 296 of 1912.]

[5th September, 1912.

GAME LAW CONSOLIDATION ORDINANCE, 1906.

UNDER and by virtue of the powers vested in me by the "Game Law Consolidation Ordinance, 1906," I do hereby cancel Government Notice No. 54 of 1910, which suspended the operation of the said Ordinance as to a portion of the Marandellas district, within an area extending one mile outwards from the African Coast Fever Cordoon Fence, in respect of sable antelope, tsessebe, eland and koodoo.

No. 310 of 1912.]

[26th September, 1912.

GAME LAW CONSOLIDATION ORDINANCE, 1906.

UNDER and by virtue of the powers vested in me by section 4 (2) of the "Game Law Consolidation Ordinance, 1906," I do hereby suspend the operation of the said Ordinance, in so far as it relates to the killing, hunting or capture of game in Class "A," in the district of Melsetter south of a line

running from the north-west beacon of the farm Gumera, along the southern boundary of Musikivatu reserve to where it intersects the western boundary of the farm Chikore, thence along the eastern boundaries of the farms Mhungura and Passage, and thence to beacon 100A on the Portuguese border, for a period of six months from the date hereof.

No. 368 of 1912.]

[28th November, 1912.]

GAME LAW CONSOLIDATION ORDINANCE, 1906.

UNDER and by virtue of the powers vested in me by section 4 (2) of the "Game Law Consolidation Ordinance, 1906," I do hereby suspend the operation of the said Ordinance, in so far as it relates to the killing, hunting or capture of game in Class "A," in the district of Ndanga, for a period of three months from the date hereof.

No. 398 of 1912.]

[26th December, 1912.]

GAME LAW CONSOLIDATION ORDINANCE, 1906.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notice No. 297 of 1912, and declare the following to be in full force and effect in lieu thereof:—

Under and by virtue of the powers vested in me by section 4 (2) of the "Game Law Consolidation Ordinance, 1906," I do hereby suspend the operation of the said Ordinance in so far as it relates to the killing, hunting or capture of game in Class "A" in that portion of the native district of Chibi which lies south of the Victoria-Belingwe Road, for a period of two months from date hereof.

No. 390 of 1912.]

[19th December, 1912.]

PROTECTION OF LOCUST BIRDS.

UNDER and by virtue of the powers vested in me by the "Game Law Consolidation Ordinance, 1906," I do hereby declare that the following Locust Birds:—

- (1) Great Locust Bird or White Stork (*Ciconia alba*);
- (2) Lesser Locust Bird or Nordmann's Pratincole (*Glareola melanoptera*);
- (3) Small White Heron or Cattle Egret (*Bubulcus ibis*);
- (4) Wattled Starling (*Dilophus carunculatus*);

are added to class "A" of the said Ordinance, and shall be strictly protected, and not hunted or destroyed, throughout Southern Rhodesia for a period of five years from date hereof.

No. 110 of 1908.]

[16th April, 1908.]

IMPORTATION OF CATTLE.

UNDER and by virtue of the powers conferred on me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and repeal so much of the Regulations published under Government Notice No. 187, dated the 26th of July, 1906, as relate to the importation of cattle from the Colony of the Cape of Good Hope and the United Kingdom of Great Britain and Ireland, and make the following provisions in lieu thereof:—

1. The importation of cattle may be permitted from the Colony of the Cape of Good Hope and the Orange River Colony on the following terms and conditions—

- (1) A permit shall be required from the Chief Inspector which may contain such conditions as shall from time to time appear expedient.
- (2) Applications for permission to import shall be in the Form "A" attached hereto, and accompanied by a declaration in the annexed Form "B."
- (3) The importation of cattle with more than two permanent central incisor teeth shall not be permitted.
- (4) All importations shall be by rail and for the purposes thereof Bulawayo shall be regarded as the port of entry.
- (5) All cattle imported in terms of these Regulations shall on arrival at Bulawayo, Salisbury, or Umtali be removed to a place of quarantine under the supervision of an Inspector of Cattle, there to be submitted to such examination and tests as the Chief Inspector may direct. If such examination or tests disclose the existence of any destructive disease the cattle shall be immediately destroyed and the carcasses thereof disposed of in such manner as a Government Veterinary Surgeon may authorise or require. The Chief Inspector may permit of any examination or tests as aforesaid being dispensed with in the case of cattle in transit by rail for any place beyond the boundaries of Southern Rhodesia.
- (6) All expenses or losses incident to quarantine, examination, testing or destruction as aforesaid shall be borne by the owner of the cattle.

2. The importation of cattle from the United Kingdom of Great Britain and Ireland may be permitted under the following terms and conditions—

- (1) Importation shall be through and direct from the coast ports of the Cape Colony, and there shall be a consignment note or other satisfactory evidence that cattle so imported have come direct from Great Britain or Ireland.
- (2) The provisions of sub-sections (5) and (6) of section 1 hereof shall apply to importations in terms of this section.

3. No person shall import cattle in terms of these Regulations except for his own use, provided however that permission may be granted to import for others on the applicant disclosing the name of the person or persons for whom he proposes to act.

4. Any person introducing cattle in contravention of these Regulations, or failing to comply with any conditions attached to permits to import, or furnishing applications, declarations, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, testing, destruction or disposal of carcasses, shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months, unless higher or greater penalties shall have been provided for such offences by the "Animals Diseases Consolidation Ordinance, 1904," provided however that the penalties imposed by these Regulations shall not exempt any cattle from destruction in terms of the aforesaid Ordinance.

ANNEXURE "A."

APPLICATION FOR CATTLE IMPORTATION PERMIT.

1. Applicant's Name and Address.....
2. Number and Class of Cattle to be imported.....
3. Area or Farm and District where Cattle are at present located.....
4. Area or Farm and District to which Cattle are to be moved.....

Applicant's Signature.....

Date.....

Application.....

Permit No.....

ANNEXURE "B."

I,
 residing on the farm
 in do solemnly and sincerely
 declare that the (number in
 writing) animals also enumerated below have been in my possession since
 birth, and that lung sickness, pleuro-pneumonia or other contagious or
 infectious disease has not existed amongst any of my cattle, nor on my
 farm, nor among any cattle with which these animals have been in contact
 within the last four years, and that these animals have never been exposed
 for sale in any public market or stock fair, nor been in contact with strange
 cattle, and that to the best of my knowledge and belief such cattle in
 travelling to Station (i.e., station where cattle
 are to be trucked) will not come into contact with any animals amongst
 which lung sickness or any other contagious or infectious disease has existed
 during that period.

Number of Animals Bulls Heifers

Breed

Seller's Name and Address

Purchaser's Name

Place in Southern Rhodesia to which animals are being sent

And I make this solemn declaration conscientiously believing the same to
 be true.

Declared to at on this
 day of before me,

Resident Magistrate for the district of

No. 211 of 1910.]

[4th August, 1910.

IMPORTATION OF CATTLE FROM NORTH-WESTERN
RHODESIA.

UNDER and by virtue of the powers vested in me by the "Animals
 Diseases Consolidation Ordinance, 1904," I do hereby declare and make
 known that, notwithstanding the prohibition contained in Government
 Notice No. 89 of 1908, the importation of cattle from North-Western
 Rhodesia may be permitted under the following terms and conditions :—

1. The permission of the Chief Inspector of Cattle shall be first had and obtained.

2. All cattle shall be introduced (a) by rail via the Victoria Falls, or (b) by way of the town or port of Feira, which are hereby declared to be ports of entry.

3. All applications for permission to import shall be accompanied by a certificate by a Government Veterinary Surgeon of North-Western Rhodesia that—

(a) the districts from which they come and through which they pass are free from contagious diseases of animals;

(b) the animals in respect of which the application is being made have been examined and are free from contagious diseases of animals.

4. All cattle shall on entry be taken, where possible by rail, to such quarantine area and shall remain in quarantine for such period as the Chief Inspector of Cattle shall direct, but not less than three months.

5. Any person found introducing cattle in contravention of these regulations, or failing to comply with any of the conditions attached to permits to import, or furnishing applications, certificates, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, etc., shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months; provided, however, that the penalties imposed by these regulations shall not exempt from liability to penalties, forfeiture, or destruction, elsewhere provided for.

ANNEXURE "A."

Certificates under Section 3.

(a) I hereby certify that I have examined the following cattle belonging to Mr.

.....cows and heifers,

.....calves,

.....oxen and bulls,

and that the districts from which they come and through which they will pass in this Territory *en route* to Southern Rhodesia are to the best of my knowledge free from all destructive diseases of cattle.

Signed.....

Government Veterinary Surgeon.

(b) I hereby certify that I have examined the following animals belonging to Mr.

.....cows and heifers,

.....calves,

.....oxen and bulls.

In my opinion these animals are free from all destructive diseases.

Signed.....

Government Veterinary Surgeon.

NOTE.—All numbers are to be expressed in words.

No. 375 of 1912.]

[28th November, 1912.]

IMPORTATION OF POULTRY.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended by the "Animals Diseases Amendment Ordinance, 1910," I do hereby declare and make known that the following regulations shall be in force and effect from date of publication hereof :—

(1) All poultry imported by rail shall be inspected by an Inspector or Sub-Inspector at Plumtree, Bulawayo or Umtali.

(2) Should any consignment of poultry shew symptoms of disease, or should such Inspector or Sub-Inspector have reason to believe that any disease exists in, or that infection is likely to be conveyed by such consignment, he may order the detention and isolation of the whole consignment for such period as he may deem necessary.

(3) The Chief Inspector may order the destruction of all poultry which he has reasonable grounds for believing to be diseased or likely to convey infection.

No. 391 of 1908.]

[17th December, 1908.]

BRANDS ORDINANCE AMENDMENT ORDINANCE, 1908.

UNDER and by virtue of the powers vested in me by the "Brands Ordinance, 1900," as amended by the "Brands Ordinance Amendment Ordinance, 1908," I do hereby cancel and withdraw the Regulations published under Government Notice No. 204 of 1900, and declare the following shall be in force in lieu thereof, from and after the 7th January, 1909 :—

1. The Registrar of Brands shall have his office in the Agricultural Department. With the exception of the Magistrate of Salisbury, the Magistrate in each district of Southern Rhodesia, and the Assistant Magistrate in each sub-district, shall be a deputy Registrar of Brands for the magisterial district or sub-district to which he is appointed. The offices of the Deputy Registrars of Brands shall be the offices of the several Magistrates.

2. (a) The form of application for registration of a brand shall be that marked "A" in the Schedule attached to this Notice.

(b) The form of a certificate of registration shall be that marked "B" in the said Schedule.

(c) The form of a transfer of a brand from one registered proprietor to another shall be that marked "C" in the said Schedule.

(d) The form of a certificate of such transfer shall be that marked "D" in the said Schedule.

3. Each Deputy Registrar of Brands shall keep a register, in the form of Schedule "E" hereto, of all brands allotted within his district under the provisions of the Ordinance.

4. Save as hereinafter provided, every registered brand shall consist of two letters and a numeral of plain and uniform pattern; and the first of the letters shall indicate the magisterial district or sub-district in which the holding is situate on which the brand is to be used, and shall be placed above the numeral and letter comprising the brand, so as to be in triangular form.

5. One brand and no more shall be allotted to any person in one magisterial district or sub-district.

6. The size of the characters branded on stock shall not be more than three inches in height nor more than two inches in width.

7. An applicant for a brand shall be allotted the next vacant brand assigned to the district in which he is located, as set forth in Schedule "F" hereof.

8. Each Deputy Registrar shall keep a list of brands assigned to his district, for the inspection of applicants for brands.

9. There shall be payable to the Registrar or Deputy Registrar --

- (a) For every separate registration of a brand, 5s.
- (b) For every transfer of a brand, 5s.

10. All brands shall be imprinted on stock as follows :--

- (a) In the case of horses, mules or donkeys, the first brand shall be imprinted either on the near side of the neck or near rump, and any second or subsequent brand shall (where there is sufficient space for such purpose) be imprinted on the same part of such animal, and at a distance of not less than one and a half inches from and directly underneath last imprint, according to the table herein set forth.

Where there is not sufficient space for the purpose, then such second or subsequent brand shall be imprinted on the part of such animal next in order, according to the following table :--

- i. Off Neck or Rump (or Thigh);
- ii. Near Shoulder (or Top of Arm);
- iii. Off Shoulder (or Top of Arm).

- (b) In the case of cattle, the first brand shall be imprinted on the near rump or thigh of the animal, and every second or subsequent brand shall be imprinted at a distance of not less than one and a half inches from and directly underneath the brand last imprinted, according to the following table :--

- i. Off Rump (or Thigh);
- ii. Near Shoulder (or Top of Arm);
- iii. Off Shoulder (or Top of Arm).

- (c) In the case of sheep and goats, the first brand shall be imprinted on the near shoulder, and all second or subsequent brands in the following order :--

- i. On Near Side or Ribs;
- ii. Near Rump (or Thigh);
- iii. Off Shoulder;
- iv. Off Side or Ribs;
- v. Off Rump (or Thigh).

- (d) In the case of ostriches :--

- i. On Near Thigh;
- ii. On Off Thigh.

11. Each proprietor of a registered brand shall have the right, in addition to imprinting his brand in the manner above prescribed, to place such brand on the ears of such animals by punching, tattooing or ear-rivets.

12. The owner of any brand may surrender the same, and the Registrar shall, on receipt of notice thereof, cancel the registration by notice in the *Gazette*.

13. When it appears to the Registrar, upon the report of a Deputy Registrar, Native Commissioner, or Cattle Inspector, that a registered brand is not in use, he may cause notice thereof to be given to the owner thereof, calling upon him to shew cause why the same should not be cancelled; if cause is not shewn to the satisfaction of the Registrar within six months after such notice, he may cancel the brand.

14. No brand which has been surrendered or cancelled shall be re-allotted until a period of five years from such surrender or cancellation has elapsed.

15. The Registrar shall, at the end of each quarter in every year, or as soon thereafter as possible, transmit for publication in the *Gazette* a statement, in the form of Schedule "E" hereto, of all brands registered under the Ordinance up to the last day of such quarter.

16. The Registrar shall allot a brand to every public pound already or hereafter to be established, and shall register the same.

The first character of every such brand shall be a diamond, and the second the dominant letter of the magisterial district or sub-district, and the third a numeral, the dominant letter to be placed above the diamond and numeral, so as to form a triangle; and the Poundmaster shall, on sale of any stock impounded therein, brand the same with such brand on the portions and in the order prescribed in these Regulations, to shew that the said brand is the last brand at that time imprinted on such stock; and any Poundmaster who shall fail to comply with the provisions of this section shall on conviction be liable to a fine not exceeding £5.

No. 311 of 1912.]

[26th September, 1912.

BRANDS ORDINANCE, 1900.

UNDER and by virtue of the powers vested in me by "The Brands Ordinance, 1900," as amended by the "Brands Ordinance Amendment Ordinance, 1908," I do hereby declare that the following districts have been added to those shewn in Schedule "F" of Government Notice No. 391 of 1908, and brands allotted as under :—

Dominant Letter or Numeral.	District Denoted.	Brands Series.	And variations
4	Nyamandhlovu	4	
		A A	
		Z Z	
5	Umzingwane	5	And variations
		A A	
		Z Z	

No. 328 of 1912.]

[17th October, 1912.

"FENCING ORDINANCE, 1904": LOMAGUNDI NATIVE DISTRICT.

UNDER and by virtue of the powers conferred on me by the "Fencing Ordinance, 1904," I do hereby define the Lomagundi native district to be a district for the purpose of the said Ordinance, and, in terms of section 4 thereof, bring the provisions of the said Ordinance into operation in the aforesaid district.

No. 23 of 1913.]

[16th January, 1913.

ESTABLISHMENT OF A POUND ON FARM "NENGWA," IN THE DISTRICT OF HARTLEY.

UNDER and by virtue of the powers vested in me by section 5 of "The Pounds and Trespasses Ordinance, 1903," I do hereby declare and make known that at the request of the Civil Commissioner, Hartley, a Pound has been established on the farm "Nengwa," near the Beatrice Mine, in the magisterial district of Hartley, and that the said Pound shall be available for the public from the 20th January, 1913.

No. 396 of 1912.]

[26th December, 1912.

RABIES.

UNDER and by virtue of the powers vested in me by section 59 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare all the districts of Southern Rhodesia to be an area coming under the operation of Part VI. of the said Ordinance, and I do further hereby publish the sub-joined regulations for preventing the spread of the disease known as rabies :

1. The regulations published under Government Notice No. 45 of 1909, as amended by Government Notices Nos. 284 of 1911 and 260 of 1912, are hereby repealed, but nothing herein contained shall affect the validity of current notices issued by the Administrator in terms of the said regulations.

2. Any Magistrate, Police Officer, Native Commissioner, Government Veterinary Surgeon, or other official vested with the performance of functions under the "Animals Diseases Consolidation Ordinance, 1904," may on its appearing to him that any dog or other animal is shewing symptoms which justify investigation as to whether such dog or animal is suffering from rabies or not, order the proper detention, isolation and control of such dog or animal, either in the hands of the owner or at some other suitable place.

3. Should any dog shew symptoms which lead to the suspicion that such dog may be suffering from rabies, the owner thereof shall forthwith notify the fact to the nearest official vested with powers under these regulations, who shall immediately report the same to the Chief Veterinary Surgeon, and shall either destroy the said dog or isolate and secure it for further observations.

4. On its appearing that any animal is actually suffering from rabies, any of the above-mentioned officials may order the destruction of such animal, or may himself destroy it, and may further take control of or destroy, if deemed necessary, any animal which has been in contact with a rabid animal or an animal suspected of being rabid.

5. The carcasses of all animals destroyed on account of their being infected with rabies shall be thoroughly burnt by the person or official destroying them, save that such parts as may be required for scientific investigation may be retained under proper precautions. In any case in which a human being has been bitten by a rabid animal, the head of such animal shall, if possible, be taken and sent to the nearest veterinary official.

6. (1) In the event of an outbreak of rabies occurring, the Administrator may, by notice in the *Gazette*, direct that all dogs within a radius of fifteen miles of such outbreak, or such other area as may be fixed, shall be kept in a safe enclosure or chained up for a period of not less than six weeks from such notification, or such other period as may be fixed, but may be taken out for exercise if kept on a chain or leash by the person exercising them.

(2) In the event of a suspected outbreak of rabies occurring, the Magistrate of the district may, and at the request of the Chief Inspector of Stock shall, direct that all dogs within a radius of fifteen miles, or such other area as may be deemed necessary, shall be kept in a safe enclosure or chained up for a period not exceeding four weeks, but may be taken out for exercise if kept on a leash or chain by the person exercising them.

(3) No dog shall be removed from any proclaimed area during such period of quarantine.

7. Notwithstanding the provisions of section 6 (1) and (2), packs of fox-hounds, harriers, or beagles, duly registered as such before the Magistrate of the district in which their owner or owners reside, may be used for the purposes of the chase when under the ordinary supervision and control of not less than two persons engaged in the chase.

8. Any person contravening any of the above regulations, or failing to carry out any of the provisions thereof, shall be liable, on conviction, to a fine not exceeding £10 for each offence; or, in default of payment, to imprisonment with or without hard labour for a period not exceeding one month.

9. These regulations shall come into operation on the 1st day of January, 1913.

No. 24 of 1913.]

[16th January, 1913.

RABIES.

WHEREAS an outbreak of rabies has occurred at Junction Farm, in the native district of Victoria, I hereby, in terms of section 6 (1) of the regulations published under Government Notice No. 396 of 1912, direct that all dogs within a radius of fifteen miles of the said farm shall be kept in a safe enclosure or chained up for a period of six weeks from date hereof. Such dogs may be taken out for exercise if kept on a chain or leash by the person exercising them.

No. 336 of 1911.]

[26th October, 1911.

RABIES.

THE following instructions regarding the treatment of persons bitten by rabid animals are published for general information.

In every case where a person has been bitten by a dog or other animal known or suspected to be rabid, the following precautions are recommended :—

- (1) The wound should be immediately and thoroughly cauterised. This, if it does not altogether prevent the disease, delays its onset sufficiently for Pasteur treatment to be successfully applied.
- (2) The patient should be sent to Salisbury for treatment at once. Delays are dangerous.
- (3) The fullest information should be sent to the Health Department as to date when bitten, locality, fate of dog, and especially reasons for supposing the dog to be mad.

[1st July, 1912.

RABIES.

SEVERAL cases have recently occurred where dogs having bitten a person or persons, were immediately destroyed and report made that they were possibly infected with rabies. In such cases it is impossible for the Veterinary Department to say in less than 18 to 20 days whether the animals were infected or not, and then only when the head of the dog concerned is received at the laboratory in a good state of preservation. Thus valuable time is lost in the treatment of persons bitten, which may lead to fatal results.

In all cases the suspected animal should, if possible, be secured by a strong collar and chain and the circumstances reported by telegram to "Veteran," Salisbury, when full instructions will be given as to the treatment and observation of the suspected animal.

No. 240 of 1910.]

[1st September, 1910.

INSECT PESTS.

UNDER and by virtue of the powers vested in me by the "Nurseries Ordinance, 1909," I hereby proclaim the undermentioned insects to be pests within the meaning of the said Ordinance :—

- The Red Scale (*Chrysomphalus aurantii*).
- The Oleander Scale (*C. hederæ*).
- The Circular Purple Scale (*C. aonidum*).
- Ross's Black Scale (*C. rossi*).
- The Purple or Mussel Scale (*Lepidosaphes beckii*).
- The Long Scale (*L. gloverii*).
- The White Peach Scale (*Aulacaspis pentagona*).
- Woolly Aphis or American Blight (*Schizoneura lanigera*).

No. 228 of 1912.]

[11th July, 1912.

IMPORTATION OF PLANTS REGULATION ORDINANCE, 1904.

UNDER and by virtue of the powers vested in me by the "Importation of Plants Regulation Ordinance, 1904," I do hereby declare and make known that Government Notices No. 306 of 1911 and No. 35 of 1912 are hereby repealed, and section 17 of the Regulations published under Government Notice No. 141 of 1906 is hereby repealed and the following regulation substituted in lieu thereof :—

- "17. The introduction into Southern Rhodesia of any plant, not being seed, fruit, bulb, tuber, cut flower, vegetable or vegetable transplant originating in the Union of South Africa, not grown in a nursery registered at the Department of Agriculture, Pretoria, under the 'Agricultural Pests Act, 1911,' is prohibited, except under special permission from the Director of Agriculture, Salisbury, Southern Rhodesia, who may impose such conditions in regard to such importation as he may think fit."

No. 319 of 1912.]

[3rd October, 1912.

IMPORTATION OF POTATOES INTO SOUTHERN RHODESIA.

UNDER and by virtue of the powers vested in me by the "Importation of Plants Regulation Ordinance, 1904," I do hereby cancel the regulations published under Government Notice No. 309 of 1909, and do substitute the following in lieu thereof :—

(1) No person shall introduce into Southern Rhodesia from outside British South Africa any consignment of potatoes unless accompanied by a statement on oath from the consignor stating fully in what country, and district of that country, the potatoes were grown, and a certificate from the Department of Agriculture or other responsible Government body or official institution of that country to the effect that the disease known as "warty disease" or "black scab," caused by the fungus *synchytrium endobioticum* Percival, is not known to occur on the farm or premises on which the potatoes were grown. Any consignment not accompanied by such documents will be liable to be seized and destroyed.

(2) Any consignment of potatoes imported from other parts of South Africa or from overseas, if found on inspection to be infested with the pest known as "root gall worm" (*hedeoedera radicolu*) will be refused admittance to Southern Rhodesia or destroyed.

(3) Should any consignment on arrival be found to be infested with "warty disease" or "black scab," it will be totally destroyed.

(4) Any person guilty of a contravention of these regulations will be liable to a fine not exceeding £10.

No. 249 of 1908.]

[27th August, 1908.

PROTECTION OF TREES.

IT is hereby notified for public information that any person who shall cut down for use as fuel, or for any other purposes than *bona-fide* farming, mining or manufacturing purposes, or cause to be so cut down the "Wild Westeria" (native name M'Pakwa or M'poea) tree, will be liable to prosecution for contravention of the provisions of the Forest and Herbage Preservation Act, 1859, and upon conviction to a fine not exceeding £100, or to imprisonment with or without hard labour for a term not exceeding six months, or to such fine and imprisonment, or to such imprisonment without a fine.

CITRUS CULTIVATION.

THE services of Mr. C. E. Farmer, Adviser on Citrus Cultivation to the British South Africa Company, are available.

The British South Africa Company will be pleased to receive applications from farmers desirous of obtaining advice from Mr. C. E. Farmer on citrus cultivation, and to place his services at the disposal of the farming community, in so far as his duties permit.

Applications, which will be dealt with in order of date, should be addressed to the Director of Land Settlement, Salisbury.

No fee will be charged for Mr. Farmer's services.

Department of Posts and Telegraphs,

Southern Rhodesia.

Postal Notice No. 24 of 1909.

AGRICULTURAL PARCELS POST.

IT is hereby notified for public information that, on and after the 1st August, 1909, any article produced, and, if manufactured, produced and manufactured within Southern Rhodesia may be transmitted by Agricultural Parcels Post at the reduced rate of sixpence for the first lb., and threepence for each subsequent lb. or fraction thereof, up to a limit of eleven lbs. in weight.

The Agricultural Parcels Post is designed to bring the producer into direct communication with the consumer, and is available for the transmission of :—

Biscuits	Dried Meats	Plants
Bread	Eggs	Poultry
Butter	Flour	Seeds
Confectionery	Flowers	Sugar
Cigarettes	Honey	Tobacco
Dried & Bottled Fruits	Jam	Wool Samples

and other articles produced within Southern Rhodesia. It does not extend beyond the borders of Southern Rhodesia.

The senders of articles at the reduced tariff applicable to the Agricultural Parcels Post will be required to sign a declaration that the contents are the *bona fide* produce of Southern Rhodesia.

The limits of size and weight, and the general regulations, are those applicable to the Inland Parcels Post.

This scheme must be regarded as purely experimental, and the Government reserves the right to modify these special rates of postage should too great a financial loss result.

G. H. EYRE,

Postmaster General.

General Post Office, Salisbury,
20th July, 1909.

REDUCED RATES FOR SALT (COARSE AND ROCK) FOR STOCK FEEDING.

THE Beira and Mashonaland and Rhodesia Railways announce that with effect from 1st March, 1913, coarse and rock salt in bags, in lots of not less than 15 tons or paying therefor, will be conveyed *via* Vryburg to all stations on these lines—Rhodesia Katanga Junction Railway excepted—at a rate of 1d. per ton per mile, owner's risk.

Reductions are also made in the rate for salt of similar description conveyed under the foregoing conditions from Beira to stations in Rhodesia; for particulars apply to Traffic Manager and Stationmasters.

RATE FOR ARSENITE OF SODA FOR DIPPING PURPOSES.

THE Beira and Mashonaland and Rhodesia Railways announce that with effect from 1st March, 1913, arsenite of soda, declared to be for cattle and sheep dipping purposes, will be carried at the rates applicable to cattle and sheep dip and dip powder, owner's risk.

RATE FOR GUANO AND FERTILISERS.

THE Beira and Mashonaland and Rhodesia Railways announce that with effect from 1st March, 1913, the scale of rates for the carriage of guano and fertilisers at owner's risk, minimum one ton or paying therefor, is revised as follows:—

Between All Stations.

1. Beira to Broken Hill, including Selukwe and West Nicholson Branches, also Vryburg to Bulawayo and beyond, except on sections 2 and 3 hereunder: Distances not exceeding 480 miles, 2d. per ton per mile, subject to a maximum of £2 per ton. 481 miles and over, 1d. per ton per mile.

2. Lomagundi, Mazoe and Blinkwater Branches: 2d. per ton per mile.

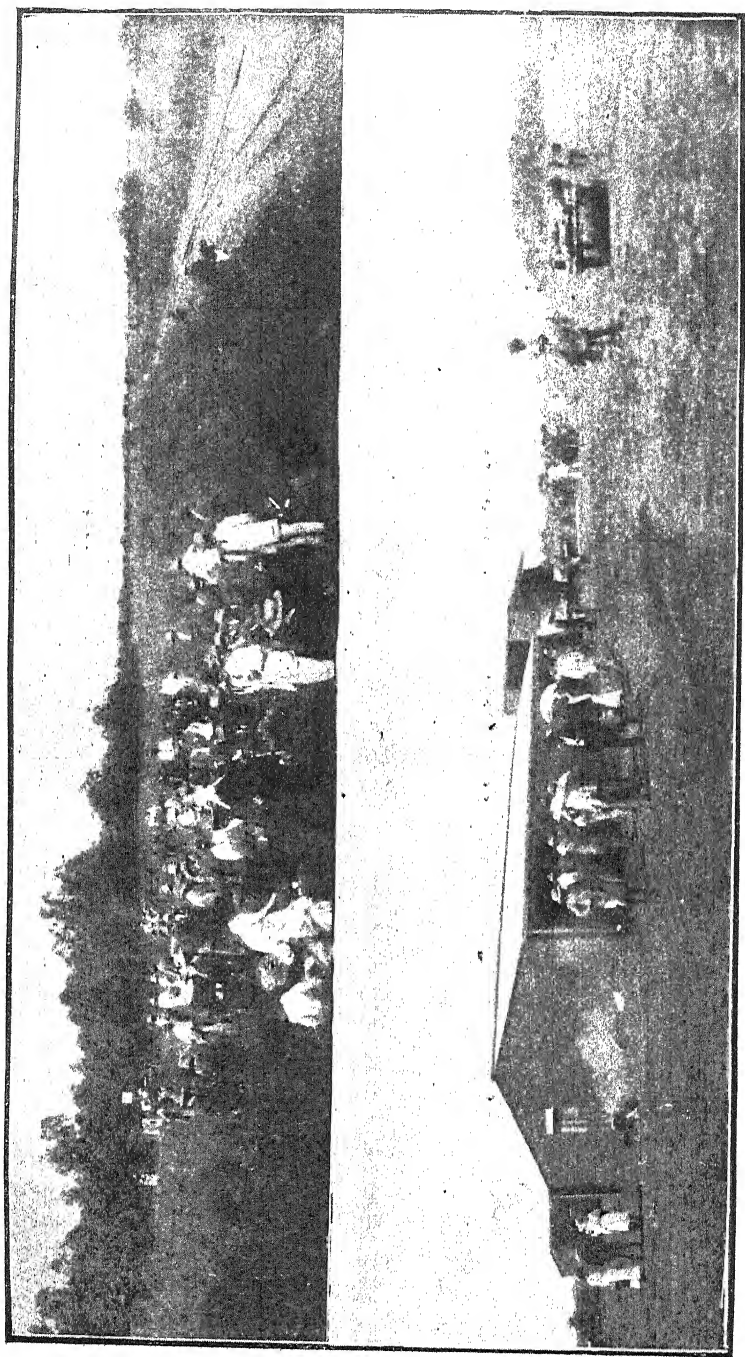
3. Rhodesia Katanga Junction Railway—Broken Hill—Congo Border: Minimum 5 tons, 6d per ton per mile. Minimum 1 ton, 7d. per ton per mile.

Minimum charge 2s. 6d. per ton.

REDUCED RATES FOR CEMENT FOR IRRIGATION PURPOSES.

THE Beira and Mashonaland and Rhodesia Railways announce that with effect from 1st January, 1913, cement certified to be for use in connection with irrigation works for agricultural purposes will be conveyed over all sections of these lines (Broken Hill-Congo Border section excepted) at the rates and conditions laid down in clause 40 of Goods Tariff Book No. 5.





Delegates to the Agricultural Union Congress at the Gwelo Experiment Farm.

Picture by J. S. Lowndes.



THE RHODESIA
Agricultural Journal.

*Edited by the Director of Agriculture,
assisted by the Staff of the Agricultural Department.*

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Editorial.

Correspondence on subjects affecting the farming industry of Southern Rhodesia is invited. Enquiries will be replied to direct, or through the medium of the JOURNAL. An interchange of ideas and suggestions between farmers will be particularly welcomed. Contributions of a suitable nature for insertion in this JOURNAL will be much appreciated. All communications regarding these matters, and advertisements, should be addressed to the Editor, Department of Agriculture, Salisbury.

THE FARMERS' CONGRESS.—The annual meeting of the Agricultural Union took place on 24th to 27th February, at Salisbury, and must be recorded as an unqualified success. The debates in general were of a high tone, with more attention to the general welfare of the country than hitherto, and were characterised by a good feeling in discussion, which cannot but lead to the best results. The subjects considered were as wide as usual, although politics, as such, were eschewed, and the progressive character of

Rhodesian agriculture was well manifested by the many and varied topics raised. A feature of the Congress was the appointment of committees to discuss with the authorities immediately concerned subjects such as grass fires and defence. By these means the views of the public interested are brought to a focus and a direct interchange of views made possible, thus materially hastening further action. Where so many important matters have been deliberated upon, it is invidious to particularise, but perhaps the Water Ordinance, the two-tooth rule and the compulsory dipping proposals may be specially mentioned.

THE SCHOOL OF AGRICULTURE.—The announcement of the proposal to establish a school of agriculture in Southern Rhodesia meets with very general appreciation and approval. In taking this step we are only following the example of other British possessions in providing means for studying the principles of rural economy and of learning on the spot their application to local conditions. The extraordinary success of such institutions in Canada and throughout Australia, and their rapid growth in public estimation in South Africa, justify the conclusion that a school of agriculture would greatly advance farming in the Territory. The success which attended the short course of lectures held at Salisbury last year shewed the desire for instruction on the part of the working farmer, and so proved the desirability of providing systematic courses of instruction for those preparing to take up the calling of agriculture in Rhodesia.

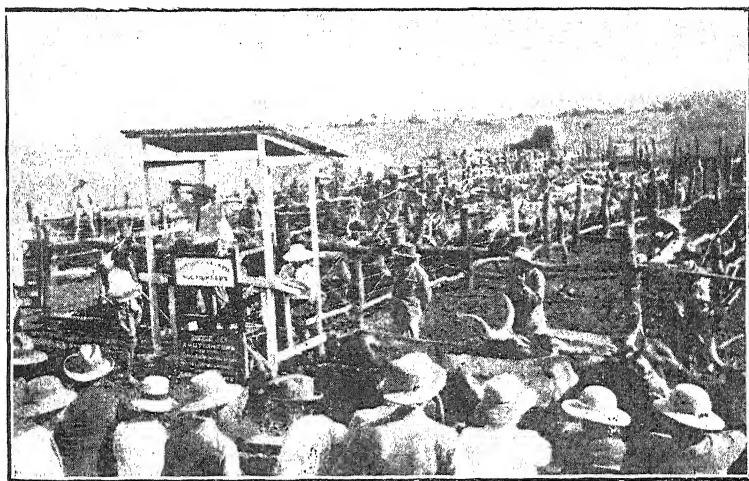
It is too early to enter yet into details regarding courses of instruction and so on, but it may be said that the first object must be to train young men to be farmers, to prepare them for what they must cope with when they take up land, to give them in every direction as practical a training as possible. Such a technical school in a young country must necessarily lay stress on the operative side, whilst not omitting the theoretical, the happy combination of which two aspects of the same subject may be regarded as the truly scientific education. Even the most experienced farmer has much to learn, and the attitude of success in farming consists of close attention to the lessons of nature and experimental research. Study of the

sciences on which the principles of agriculture rest, chemistry, biology, physics and geology, are fundamental to a comprehension of the conditions met with in new countries, whilst constant experimentation and an understanding of how to conduct experiments and translate their results to practice are the keys to success. These, coupled with practical experience of the operations of the farm, are the training to be aimed at by any agricultural education in Rhodesia.

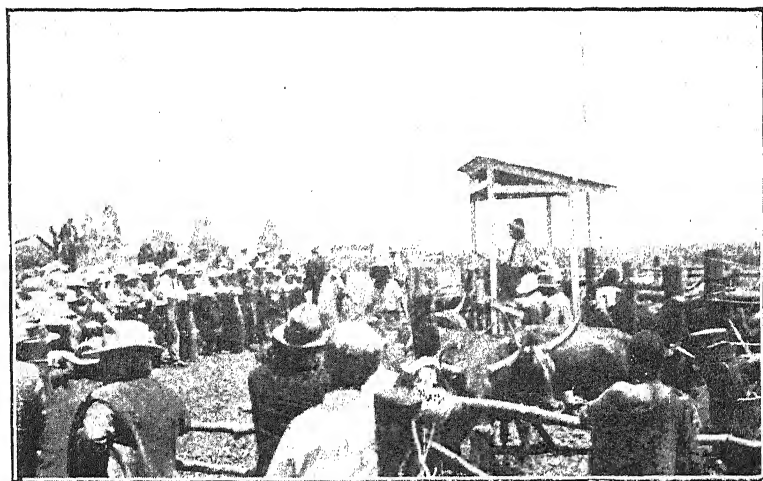
SALE OF FRIESLAND CATTLE.—A notable event in the annals of cattle breeding in Southern Rhodesia was the dispersion sale of the Pomona herd of pure-bred Friesland cattle, owing to the regretted illness of the owner, Mr. A. J. Macclaurin, who has, during a number of years past, built up the herd to its present high standard of excellence. Ninety-five head came under the hammer, wielded by Mr. W. H. Williamson, of Salisbury, and they were disposed of amongst a large circle of farmers, the bidding being frequently spirited. With the object of preserving at least the nucleus of this herd intact, the Department of Agriculture purchased 10 cows, 6 heifers, and 2 calves of the best strains and pedigree, as also the American-bred bull, Dutchland Colantha Sir Cornucopia. This animal was only lately imported at a considerable outlay, and comes of ancestry renowned for their large milk yield and high butter fat content; indeed, they are amongst the record animals of America in these respects. It is proposed to maintain this herd at the Government Farm, Gwebi, to provide high-class stud bulls to those requiring them, continuing what has hitherto been so creditably carried on by Mr. Macclaurin.

SALE OF STOCK AT GWELO.—A very successful sale of native cattle was held at Gwelo on the 3rd and 4th of March, Messrs. Boggie and Co. and Messrs. Leonard and Lezard being the auctioneers in conjunction.

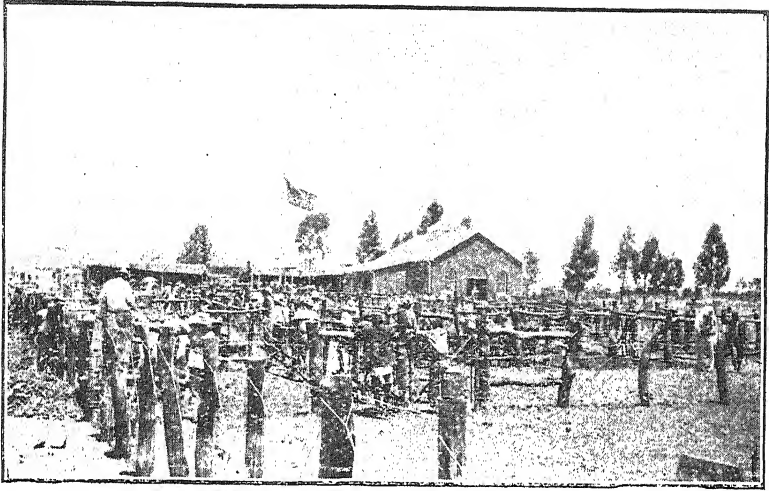
The stock offered consisted of breeding and slaughter animals of native type, which had been acquired by the Government in the Chibi and Belingwe districts in the course of native relief operations. The cattle were of fair average quality, and in good condition, and the prices realised for the various lots were very satisfactory.



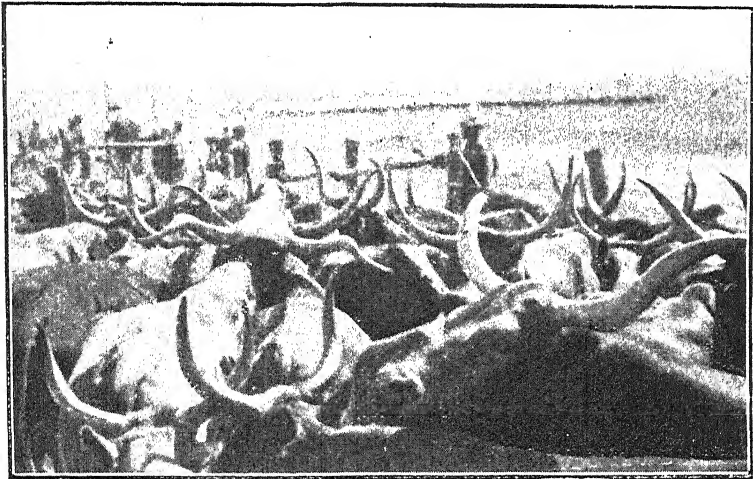
Sale of Cattle at Gwelo, March, 1913.



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tralia maize and cowpeas are the two principal crops grown for silage, while in America the cowpea is one of the most important fodder crops on the "mixed" farm.

Rhodesian bean crops may be divided into three classes—ordinary beans, velvet beans and cowpeas. Beans of the kidney type (*Phaseolus spp.*) such as sugar beans, butter beans and Canadian Wonder beans, are often grown as field crops for the sake of the dry beans, which are largely fed on the mines. Beans of this class, however, very seldom form root nodules, and are consequently of little or no value as soil enrichers. Further, they require rich soil and the addition of manure to produce profitable crops. Velvet beans (*Mucuna utilis*) are being increasingly grown as a leguminous hay crop, or for use in the silo. These, again, require good land to produce heavy crops, and do not usually appear to thrive well on light sandy soils unless manured. They form nodules but scantily, except on heavy black soils, and the crop can only be used for stock feed. Cowpeas and kaffir beans (*Vigna catjang*) are of many varieties, some with bush habit of growth and some semi-prostrate. These crops form nodules very freely on all classes of Rhodesian soils, and may, therefore, be expected to prove valuable in rotation as soil renovators. The dry beans can be harvested for sale on the mines, or can be crushed or ground for home feed, in the form of bean meal. The dry bean straw, after threshing out the seed, is readily eaten by stock, while, if preferred, the crop may be cut early and converted into bean hay, or used in the silo.

It will thus be seen that the cowpea possesses a dual advantage, in that it can be grown either for the dry beans or for fodder, or for both at one and the same time. Further, that it is suited to a great variety of soils, particularly those of a lighter character, and that, owing to its habit of forming root nodules in which nitrogen is stored, it is more valuable as a soil improver than any of the other classes of beans referred to.

THE LAND BANK.—It has been regarded as a defect of the Land Bank that it has hitherto afforded no assistance to farmers for small loans. Many persons require only a comparatively small amount, and object to mortgaging their properties

worth many times as much to obtain it. We are pleased to state that this difficulty has been overcome, and that the Land Bank is now prepared to grant small loans up to £150 on the personal guarantee of two satisfactory sureties. These loans, which will bear interest at the rate of 7 per cent. per annum, must be for definite agricultural purposes, and are repayable in one year, but power is given to renew them for a further period of twelve months, if such a course is considered desirable by the Bank. This facility will be of particular assistance to farmers for such works as water boring, the construction of dipping tanks, and the erection of fences, etc., and we trust that advantage will be taken of the opportunity to effect these desirable improvements.

We would take this opportunity of drawing attention to the new condition made by the Land Bank, in the interest of the creditors themselves, that all applications for loans must be made direct to the Land Bank by the applicants, and not through agents or second parties.

IRRIGATION IN AUSTRALIA.—During his recent visit to Australia the Director of Agriculture spent an instructive and pleasant day examining the irrigation works on the lower reaches of the Murray River in company with Mr. McIntosh, the Director of Irrigation for South Australia.

Many subjects of mutual interest were discussed, and as much information applicable to Rhodesia is contained in condensed form in an article by Mr. McIntosh, entitled, "Hints to Intending Irrigationists," which appeared in the *Journal of Agriculture of South Australia*, we make no apology for reproducing it here.

The words of caution and advice are as applicable to the farmers in this Territory as to those for whom they were originally penned, and will come as a word in season to many from an outside and highly authoritative source.

LEAVE OF ABSENCE.—Mr. Ll. E. W. Bevan.—The Government Veterinary Bacteriologist, Mr. Ll. Bevan, M.R.C.V.S., has been granted a special extension of leave for the purpose of studying the latest advances of science in con-

nection with the obscure diseases of live stock with which we in Rhodesia have to contend. The study of blood diseases and parasitic ailments of stock generally is a matter of vital interest to Rhodesia. Remote as we are from the chief centres of research in Paris, London and Liverpool, it is well to take every opportunity of adding to our knowledge by means of actual personal touch between investigators and by direct observation which is so much more instructive than any mere literature can possibly be.

Whilst study leave of this nature can only be given to Government officers under very exceptional circumstances, it will be generally recognised that the nature and importance of the researches conducted by Mr. Bevan in Rhodesia amply warrant the step in this instance.

Mr. H. G. Mundy.—Mr. H. G. Mundy, F.L.S., Agriculturist and Botanist in the Department of Agriculture, is proceeding to England on leave of absence. Mr. Mundy has been commissioned to proceed to America to gather information on behalf of this Administration regarding the methods of agricultural research in the United States and Canada, and to ascertain the latest advances of scientific agriculture there, for which special purpose an extension of leave has been accorded him. Much attention will also be devoted to a search for seed of plants and crops, the introduction of which to Rhodesia is likely to prove of value. His enquiries may be expected to result in practical suggestions for application to Rhodesian farming, and in a store of valuable suggestions for the experimental work on which he is particularly engaged.

OUR IMPORTS.—The Trade Returns, giving a list of imports into Southern Rhodesia for the twelve months ended December, 1912, give some figures which are well worthy of note, as shewing the continued shortfall in the production of articles which can and should be supplied locally. We find that during 1912 butter to the value of £26,666 was obtained from outside the territory, an increase of £2,610 over the previous year. Of the total quantity, it is interesting to note that we procured the great bulk, £19,920, from South Africa. Our imports of cheese totalled £6,922, a trifling decrease as com-

pared with 1912. The local production of eggs during 1912 evidently was very short, for we imported no less than 2,261,792. During the previous year our outside supplies numbered 1,940,166. There would certainly appear to be ample scope for the poultry farmer in Rhodesia. Condensed milk is largely used in Southern Rhodesia, and our consumption of the lactic fluid during 1912 amounted to £18,567. We do not at present expect to supply locally all our meat foods, but our imports should not surely amount to £46,132. No doubt these figures are affected to a very great extent by the recent drought, and, when normal seasons return, we may expect a very general improvement and recovery in these directions.

HANDBOOK OF TOBACCO CULTURE.—It is with much pleasure we announce that the "Handbook of Tobacco Culture in Southern Rhodesia" is now ready, and can be obtained from the Department of Agriculture at a charge of 2s. 6d., post free. The book is a revision of the work issued by the British South Africa Company in 1905, and compiled by Mr. G. M. Odum, at that time attached to the Department of Agriculture. Great strides in the tobacco industry of this country have been made since then, and the new handbook contains a fund of valuable information gained in this territory, the outcome of the experience of growers and experts working together, and the results of careful experiment. We venture to think that the work will be useful alike to the beginner and the experienced tobacco grower.

Prospects for Importation of Cattle from Australia.

By ERIC A. NOBBS, Ph.D., B.Sc., Director of Agriculture.

OBJECT OF THE MISSION.—The motive for an enquiry into the prospects of importing cattle into Rhodesia from Australia rests upon the present position and the outlook of the cattle industry here. Without entering at length upon the matter, a brief summary of the situation may not be out of place. We have, it is generally admitted by competent authorities, in Rhodesia a country admirably adapted for cattle raising, and comparing favourably in this respect with most parts of the globe. The position of Rhodesia as regards enzootic disease of stock is reassuring, for it appears that not only are the preventive measures, in force effectual, but that when disease does appear it can be controlled and suppressed, so that general epizootics such as used to occur are now very unlikely. In this respect I find we compare favourably with other countries which enjoy, in the popular estimation, a better reputation than do we. The unfortunate shortage of grass and water in Matabeleland, on account of drought at the time of writing, may on past experience be regarded as a transitory evil. The local demand for beef is growing. The price of meat is unduly high, and the prospects of an increasing consumption are great, whilst there is every prospect of an outlet in the southern and overseas market when we attain to a surplus beyond our own requirements. The general use of oxen throughout the country for draught still further augments the demand for cattle. Finally, our nascent dairy industry, the prospects of which are so encouraging, demands the provision of suitable stock. Approximately the cattle in

Southern Rhodesia number half a million, of which three-fifths are in the hands of natives, and hence of but little significance, save as a source of supply under exceptional circumstances. Moreover, whilst possessing the virtues of hardiness and prolificacy in extraordinary measure, as a class native stock are small and slow maturing, and of primitive type. Whilst useful for foundation stock, they are not in themselves adapted to the production of beef or milk on those modern lines which we must adopt if we are ever to establish the cattle industry on commercial lines. The improvement of our stock, that is, the production of more highly specialised and more profitable animals, whether it be for beef or milk or dual purposes, is a vital and urgent necessity to the progress of the industry. Our cattle, such as we have, are happily multiplying fast. Apart from importation of female stock, we can vastly improve our herds in the immediate future by superimposing on the native stock the flesh and milk-producing qualities of European cattle—always provided we adopt the methods of management followed in civilised countries and superior to those followed by the native stock owner during past centuries.

A certain number of well-bred sires introduced now, whilst the total figures are relatively small, will have a vastly greater effect on the future of Rhodesia than the same or a greater number introduced a few years hence, when their influence would be lost. The present is therefore a critical time, and the more largely we can influence the character of our local cattle at this comparatively early stage in our history, the more simple will be our future problems, and the more remunerative will our pastoral industry become. In Australia, this problem never arose, as there were no cattle in the country previous to European occupation. Hardiness is a great merit, but for profit, quicker returns and a higher productive capacity are requisite, and these are only to be secured by the introduction of blood of highly specialised beef, dairy, or dual purpose breeds, coupled with improved methods, under which term are embraced matters connected with paddocking, dipping, feeding, shelter and rational treatment generally. The need, therefore, of an infusion of blood of European breeds is manifest. The next question that arises is the sources from which such stock is procurable.

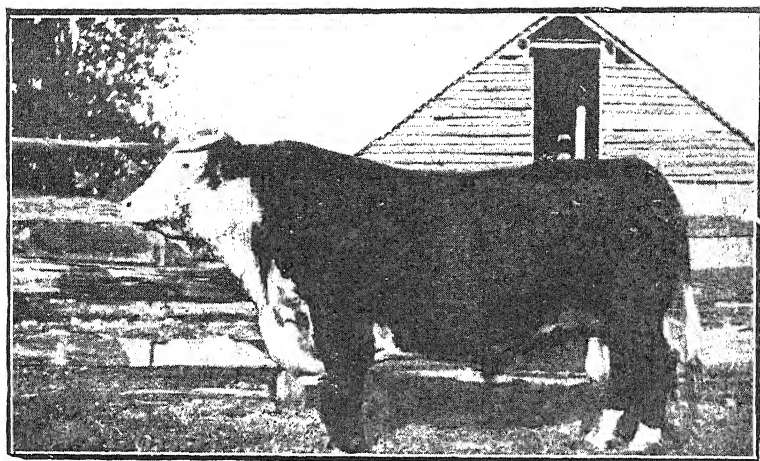
The Union of South Africa, so far as safety permits, has for long been drawn upon by us to its fullest capacity, whilst really pure-bred stock cannot be obtained in the numbers desired. Moreover, as a general statement it may be said that pure-bred South African cattle shew a tendency to loss of size, particularly the meat breeds—Shorthorns, Herefords and Devons—a tendency which we with our diminutive indigenous stock must seek to avoid. Recent experience in connection with foot and mouth disease shews that England, undoubtedly the perennial fount of the best blood, cannot be always relied upon. It must be admitted also that the forcing methods adopted in rearing stud cattle at Home results in a delicacy of constitution which unfits them to withstand inoculation, or at least renders the operation more hazardous, whilst such artificially reared stock is not in good condition to withstand the strain of acclimatisation. Our recent heavy losses in this connection are to be remembered. The prime and landed cost of pure stock from the British Isles is also very high, and to this must be added a certain mortality during inoculation.

In these circumstances the possibility of opening up an additional source of supply, both of high-class pure-bred bulls and cows, and also perhaps commercial breeding cattle, deserves attention. Preliminary enquiries made regarding conditions in the Argentine, Texas, and Australasia indicated the prospect as hopeful in the island continent and adverse elsewhere. From certain quarters the desirability was urged of endeavouring to procure stud cattle from Queensland, where conditions not dissimilar to ours obtain, and in particular where redwater is enzootic over large areas. Stock from such parts, it was argued, would not, or might not, require protective inoculation. Certainly, investigation of these weighty assertions was justified, and, as there were also other problems connected with agriculture justifying examination, I was despatched on this mission of enquiry.

RESULT OF ENQUIRIES.—It will simplify matters to record at this point the conclusions formed with regard to the desirability of importing cattle from Australia to Rhodesia, before proceeding to give at length my observations and the ground for arriving at these opinions.

I found that in Australia we could purchase at nearly one-half the price cattle quite as good, and in certain, though perhaps not in all, important respects preferable to those of recent consignments from England. The number of such, however, I found to be comparatively limited, and it is apparent that in any one year no very great number of suitable stock—perhaps in all 80 or 100 bulls and as many heifers of all breeds—could be procured in the States from which importation is recommended. It must be remembered that amongst Shorthorns only red, or mainly red, animals are wanted here, which at once limits the supply, whilst it is also assumed, in making the above calculation, that considerable discrimination would be exercised in selecting stock, whilst neither the cheapest nor the dearest lines would be considered. The number obtainable from Australia is further restricted by the fact that, after the most careful examination, I am unable for the present to recommend the admission of cattle from New South Wales, nor at any time at all from Queensland. This unexpected outcome of my enquiries is due entirely to the position in these two States with regard to pleuro-pneumonia, and has no connection with the existence of redwater in parts of Queensland and the more or less problematical risks associated therewith. Reliable information rendered it unnecessary for me to prosecute my enquiries into Western Australia and the northern territories, whilst time did not permit of my proceeding to New Zealand. From Victoria, South Australia, and Tasmania there are no grounds for excluding stock; indeed, on the contrary, there is every reason to encourage and welcome importation thence, subject to the same safeguards as are imposed on cattle coming from England or the Union of South Africa.

In the three States from which purchase may with entire confidence be recommended there are only somewhere about 50 prominent breeders, of whom about 30 are in Victoria, 12 in South Australia and 8 in Tasmania, while of these again approximately there are 20 breeders of Shorthorns, 12 of beef, and 8 of dairy types, 11 breeders of Herefords, 8 of Jersey, 7 of Ayrshire, 3 of Aberdeen Angus and single supporters of North Devons, South Devons and Red Polls. Of course such an enumeration can but be approximate, and by no means final. There are



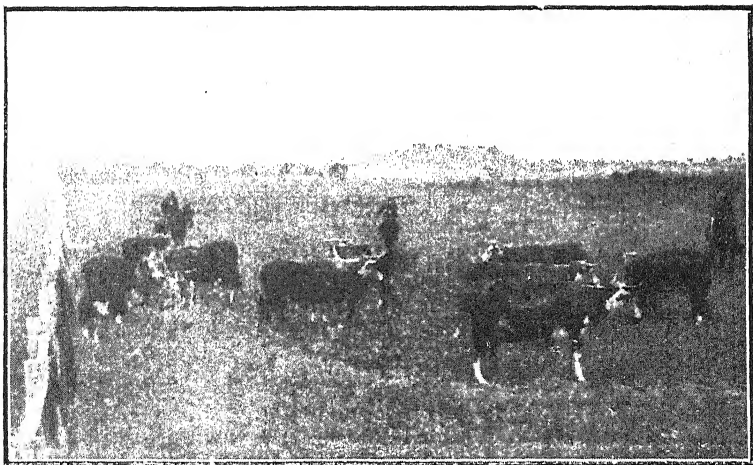
Hereford Bull, the property of Mr. Sidney Reynolds Patterson, New South Wales,
and a winner of many prizes and championships.



The Hill River stud herd of Hereford Cattle on the home pastures.
The property of the Angas Trustees, South Australia.



Stud Hereford Cows, the property of Mr. John A. Beattie, Gisborne Park,
Victoria.



Stud herd of Hereford Cattle, the property of the Hon. S. Winter Cook,
Nucndal, Victoria.

very many more breeders of stock, but the above list includes all the chief and recognised studs of high standing. Of these, I inspected carefully 20 herds, including 11 of Short-horns and 4 of Hereford. There are numbers of stud breeders also in those States from which purchase is not advised, namely, New South Wales and Queensland, where I also saw a number of the leading herds to which, however, there is no occasion for further reference. The stud herds on State farms are also not included in this review. Importation of ordinary breeding stock cannot be recommended. The expenses of importation are too considerable, especially since to these must be added the cost of inoculation on arrival. Such stock could not be procured from the redwater areas of Queensland for reasons already given. This idea must therefore be dismissed on financial grounds. It would also be difficult in the case of such stock to satisfy the conditions enforced in the certificates required by us on all importations, as ordinary breeding cattle have usually changed hands, and been exposed for sale at public markets frequently in the course of their lives.

In view of my conclusions being so very different to what, prior to my personal enquiry on the spot, had been anticipated, I deemed it inadvisable to recommend any purchase until the position had been fully explained to the Administration here and to the public concerned.

The accompanying particulars are derived from many sources known to be reliable and authoritative. They were checked, as far as might be, by frequent cross questionings and comparison of replies. Every endeavour was made to eliminate prejudice and get at the truth, and I give the facts as they were given to me.

HEALTH OF CATTLE.—On the point of general health of cattle, it may be said that Australia is on the whole fairly free from diseases, with a comparatively low mortality of stock from this cause with certain notable exceptions, which will be dealt with subsequently.

Coast fever, rinderpest and foot and mouth disease are unknown there, and interruptions, such as have occurred in England on this account, or for other reasons, are improbable. The condition of each State in this important connection will

be dealt with separately. The Commonwealth is of such vast extent, and divided into such politically distinct States, very different to the Provinces of the Union, that it would be absurd to exclude stock from one portion on account of disease in another.

It says something for the general health of stock in Australia that Tasmania has remained so free of disease throughout its history, in spite of a considerable commerce in live stock with the mainland, and a somewhat ineffective quarantine system. A detention of ninety days of cattle on landing is insisted upon, but no instance of imported disease has, during 40 years, come to light thereby, except once when some warble maggots were found in the skin of cattle from England. The conditions under which cattle might be admitted into Rhodesia from Victoria, South Australia and Tasmania, with which there should be no difficulty in complying, may be indicated. A declaration would be required to the effect that the stock in question had been in the possession of the owner from birth, and that no pleuro-pneumonia, black quarter, nor contagious abortion had existed amongst any cattle on the farm, nor amongst any cattle with which these had been in contact, within the last four years, and that these animals had never been exposed for sale in any public market or stock fair or been in contact with strange cattle, and that in travelling to the port of shipment they would not come in contact with any animals amongst which the above-named or other contagious disease had existed during that period. Further, a certificate of individual freedom from actinomycosis would be required, and also that the stock had successfully undergone the tuberculin test which, however, might, as an additional precaution, be again applied on arrival in this country.

SHIPPING ARRANGEMENTS.—With regard to shipment, representatives of a number of firms were visited, and interrogated as to terms and so on. Quite a number indicated that they did not care to carry cattle in their ships, but others were prepared to do so, and to facilitate business in every way. Freights will vary according to numbers and circumstances; an average is about £8 from Melbourne or Adelaide to Capetown, with free freight for food for voyage, provided by consignor. The ship provides fittings, water and, where only a few head are carried, attendance can be arranged for, but

special stockmen must accompany any large number. No difficulty attaches to cattle being exported from one State by a steamer touching at ports of other States, and transshipment of stock from Tasmania to ocean steamers at Melbourne can, I was assured by the Controller-General of Customs, be arranged for.

Insurance of cattle may be effected with various firms, at rates which vary from five to eight guineas per cent. for the voyage, and about 27s. per head for the rail journey from the coast, with certain abatements if no claim is lodged. There are many firms prepared to buy and despatch stock on a commission basis, payment being arranged through the banks on presentation of shipping documents.

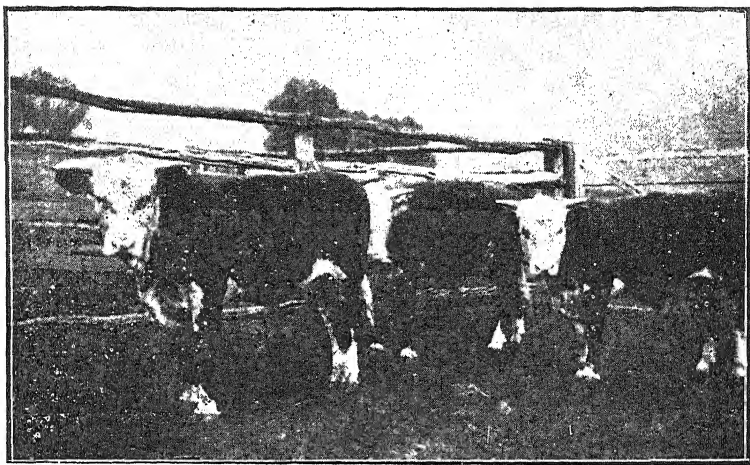
QUEENSLAND.—It has been stated above that importation from Queensland cannot be recommended, on account of the condition of that country with respect to pleuro-pneumonia.

Lung-sickness is admittedly prevalent in many districts, and, whilst all known outbreaks are dealt with, yet it appears that the disease is often undetected, especially on the large holdings of the interior, and that in general it is not under control, and no reliable guarantee can be given as regards freedom from contagion. Information received prior to my visit led to the belief that the conditions were such as to render permissible exportation under precautions similar to those applied to export from the British Isles or the Union of South Africa. Official weekly returns of the known outbreaks of pleuro-pneumonia in each of the States were shewn me in their respective veterinary offices. Those for Queensland, though not numerous as regards outbreaks, involved considerable numbers of animals in each instance. The prevalence of lung-sickness is corroborated by statistics of certain large freezing works, shewing the number of carcasses condemned by Government Inspectors on account of pleuro-pneumonia. I was shewn returns covering many thousands of cattle bought for the freezing works in mobs numbering from 30 up to 400 head, but generally averaging 200 to 300 head. In every lot, with very rare exceptions, there were 2, 4, 8 and up to 60 and more quarters condemned on this account apart from other causes such as tuberculosis, poverty, injury, etc. Many of these cases were "dry," *i.e.*, inactive "lungers." The Government inspection is exceedingly thorough and careful, so that

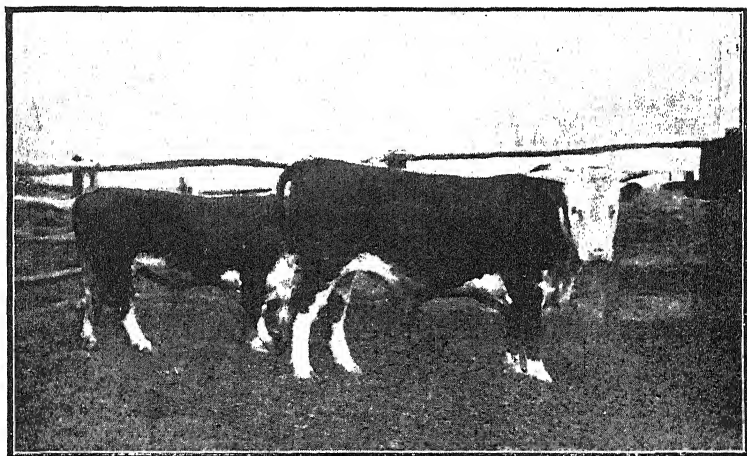
only perfectly wholesome meat is passed, and these figures can be regarded as reliable. Such cattle come mainly from the large ranches in the back country, where disease is not under careful control, and lung-sickness exists unknown to everyone until the cattle come under close observation on their way to market, or after slaughter. Thus, whilst the amount of pleuro-pneumonia in Queensland cannot be precisely furnished, it is yet obvious that it is by no means uncommon. This view is supported by the fact that in the year 1911-12 inoculation material for upwards of 50,000 head was supplied by the Government Bacteriologist. The condition of affairs indicated above is attributable to two causes: first, the primitive lines on which the cattle-raising industry is conducted with a minimum of care and supervision; second, that with ten times the number of cattle that we have in Rhodesia—5,073,201 head—besides upwards of 20,000,000 sheep and over 600,000 horses, there are for the administrative control of disease throughout a territory four and a half times the size of ours only 49 Stock Inspectors and four qualified Veterinary Surgeons. It has been pointed out by our Veterinary Bacteriologist, Mr. Bevan, that it is by no means certain that cattle from the redwater areas of Queensland will prove immune to Rhodesian plasmoses. This is a moot point, but the element of uncertainty that exists furnishes a further reason for discouraging importation from that State, the only one in the Commonwealth in which redwater exists. Although authorised by cable to purchase a few head in Queensland for purposes of experimental investigation into the nature of Queensland redwater, and a comparison of the disease as found there with the South African form, I abstained from doing so, as my motive for discountenancing importation of cattle from Queensland is not owing to the existence of redwater, but on account of the prevalence of lung-sickness.

Such being the position in Queensland, and importation of cattle thence into Rhodesia not being warranted for many years, if ever, it was unnecessary to make enquiries regarding breeders, prices or quality of stock, nor as to channels of trade, as was done in those States where the prospects are different.

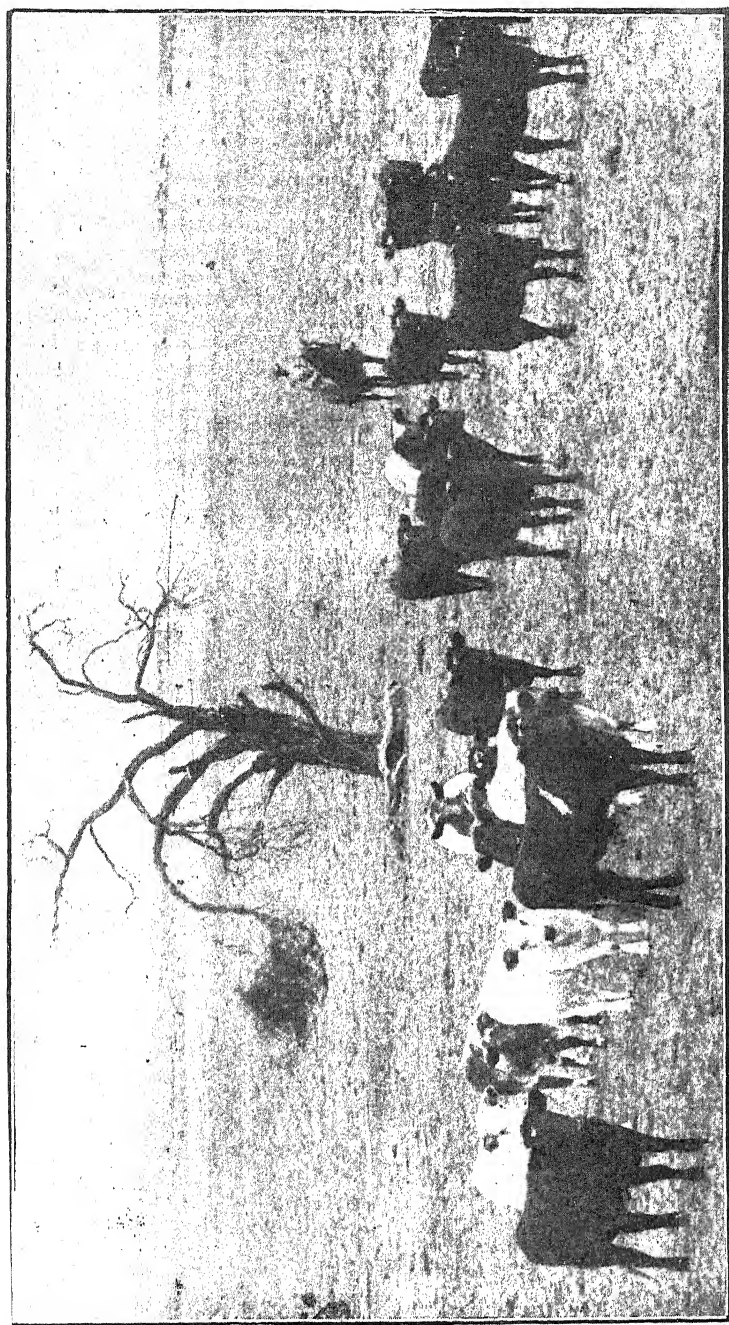
NEW SOUTH WALES.—The prospects of obtaining cattle from New South Wales can, after the explanations given above, be more briefly dismissed.



Young Hereford Stud Bulls, owned by the Angas Trustees,
Hill River, South Australia,



Young Hereford Stud Bulls, owned by the Angas Trustees,
Hill River, South Australia,



Shorthorn Yearling Heifers, belonging to the Angas Trustees, Point Sturt, South Australia.

Lung-sickness is admittedly general in New South Wales, and the number of outbreaks last year was approximately one hundred, mostly along the northern Queensland border, and also, unfortunately, in those parts of the country where stud cattle are largely bred, particularly to the north and west of Newcastle. Most, but not all, the year's outbreaks were traced to stock brought down from Queensland. The position as regards this and other diseases appears to be fairly definitely ascertained and accurately known in New South Wales, and the means of inspection and control not inadequate.

After consultation with the veterinary authorities in Sydney, it does not seem advisable to recommend the importation of cattle from New South Wales at the present time, though the objections are not so serious as in the case of Queensland.

This conclusion is the more to be regretted as there are undoubtedly very fine pure-bred cattle to be had there, particularly Shorthorns, Herefords, Devons and Jerseys. In the circumstances, however, it is unnecessary to describe the herds visited. Whilst it is quite possible that in many cases the requirements indicated in our importation certificates could be complied with and vouched for by the veterinary authorities at that end, yet there are large quantities of stock which could not be relied upon, and no means exist of guaranteeing their exclusion. As to other diseases, contagious abortion is frequent, least on the larger stations, and worst in certain localities in the dairy districts. Tuberculosis occurs as generally as in most other countries. Anthrax was common ten years ago, but is now almost unknown. There is a good deal of actinomycosis (lumpy jaw). The nodular disease has been found in locally-bred cattle, but only rarely. Black quarter is not regarded as dangerous and redwater is non-existent.

Generally speaking, diseases of stock in New South Wales are under control, and, whilst it may be sufficiently safe to take stock thence to countries like Natal, the Transvaal and the Orange Free State, where lung-sickness is known to exist, it is questionable whether this course is expedient or justifiable in the case of Rhodesia, which is free from this

disease, the recent and isolated case near Plumtree notwithstanding. The results of importations from New South Wales into the Union may be watched with interest.

VICTORIA.—As Victoria is one of those States from which export of cattle to Rhodesia is recommended, the conditions there demand some attention. Of late years there has been an extraordinary development of the dairy industry, completely altering the cattle industry from one of beef-raising on extensive lines to milk-production in an intensive way. The breed most largely represented is the Ayrshire, and next to that the Shorthorn, particularly the milking Shorthorn, although there are a number of stud herds of the beef strain of old standing and great excellence. Jerseys, too, are popular, but other breeds are of little consequence. Though not exporting beef, there is a large trade in stud stock of beef-producing breeds as well as dairy stock from Victoria to New South Wales and Queensland. To see all herds of note was out of the question, but a representative selection under the advice of officers of the Agricultural Department and the Royal Agricultural Society was so arranged as to permit my visiting as many as possible in the time available.

Control of disease is effective in Victoria, outbreaks of any kind are not numerous, and, from the mortality in each case, it is evident that they are promptly checked. In the annual report of the Chief Veterinary Officer for the year ending 30th June, 1912, 39 deaths are recorded, due to anthrax at 5 centres, 160 cases of actinomycosis and 152 head destroyed on shewing signs of tuberculosis. Black quarter does not occur to any appreciable extent; it is present on a few farms in Gippsland, where inoculation against it is carried out. Worm nodules (*Onchocerca Gibsoni*) was until recently supposed to be a condition non-existent in Victoria-bred cattle. One case in a cow bred in Victoria has, however, recently come to light. The disease is not regarded with any apprehension, and leads only to condemnation of the brisket of cattle slaughtered for consumption. Epizootic abortion and contagious mammites exist, but to no very great extent, and it has not yet been considered necessary to impose quarantine restrictions in connection therewith. These diseases exist only in isolated districts, and the method adopted for their

suppression is to take in hand a farm and demonstrate thereon the procedure recommended for cleansing it, thus encouraging others to adopt the same methods. The Chief Veterinary Officer furnishes me with the information that last year,

“ Of pleuro-pneumonia, there were six outbreaks, responsible for the slaughter of 53 head as diseased and 12 as contacts on suspicion; whilst on three premises—the quarantine on which was running from the previous year—24 diseased animals and 60 contacts were destroyed. In nearly every case a careful enquiry into the transactions of the farm for some time previously revealed a clear linking up of the outbreak with a pre-existing one on the same or another farm. So clear is this evidence in most cases, that it may be safely stated that the disease could at very small expense, and within a very few years, be completely eradicated from Victoria, if it were possible or expedient to prohibit absolutely the introduction of cattle from New South Wales and Queensland.”

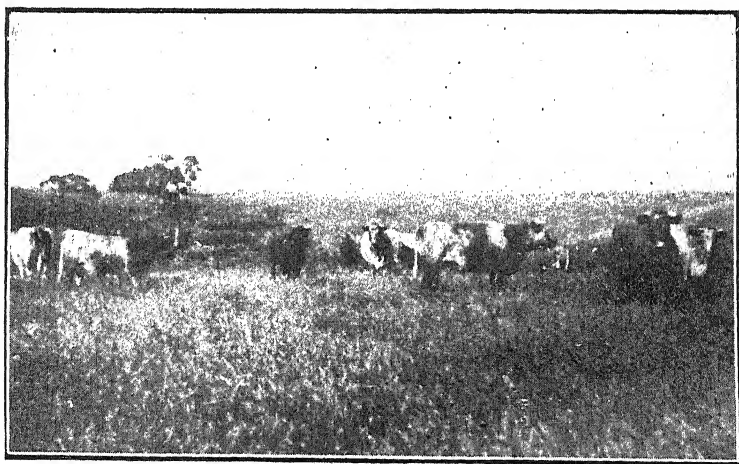
At the time of my visit there were in Victoria two outbreaks of pleuro-pneumonia, one dating from November, 1911, and still under surveillance, but early release from quarantine was expected, the other a recent case. Mr. Graham, Minister for Agriculture, and Dr. Cameron, himself a veterinarian, assured me that there had been no indigenous outbreak of pleuro-pneumonia in Victoria in the past four or five years, all infections having been traced to New South Wales or Queensland, none to South Australia, which is in a position similar to Victoria. There is no embargo against Victorian cattle going into any other State, except the quarantine imposed in Tasmania against all stock from any part of the world. To render these statements more instructive, it may be added that the latest available statistics give the number of cattle in Victoria at 1,547,569 head.

The most noted herd of Shorthorns in Victoria (some claim in all Australia) is that of Sir Rupert Clarke at Bolinda Vale, for very many years under the care of Mr. Robert Clarke. Undoubtedly this herd is one of the most interesting in Aus-

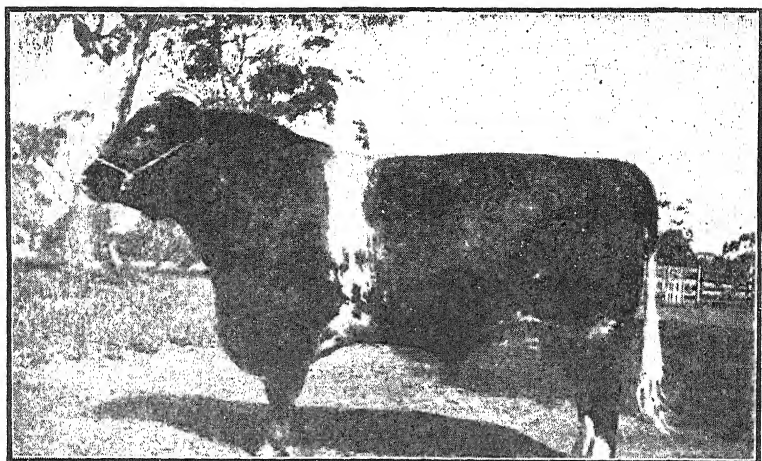
tralia, and has exercised an enormous influence all over the continent. The herd now numbers about 50 cows, and this strain, known as the Bolinda Vale Derrimuts, is much sought after. They possess great wealth of flesh and fattening powers, together with symmetry, depth and width of frame on short legs, but are a somewhat slower maturing stock than their great rivals, the Angus Shorthorns of South Australia. The herd dates back to 1878, and was founded on the best blood in the country at that time, one of the principal cows, Oxford Summerton, costing 1,600 guineas. Several of the famous Derrimut family were obtained, a family which boasts a pedigree dating back to the early and great names of the Shorthorn breed, such as Marfleet's old red bull, R. Colling's son of Favourite, Comet, Bates's Duke of Athol, and even Hubback himself; the blood is thus equal to the best and purest in the world. The first bulls used were also Derrimuts, thus the herd is essentially of that notable family, and possesses remarkable prepotency and family likeness, which makes them quite recognisable once the characteristic features have been learned. The progeny of this herd is disposed of partly by auction at the principal shows, partly by private purchase, and prices vary accordingly, but average yearling bulls fetch somewhere about 75 guineas. To find faults where such a high degree of perfection exists is difficult, and no criticism can take away from the deservedly high reputation of the herd—a reputation on which it and others of the same family are perhaps inclined to trade. A second stud, akin to the Bolinda Vale Derrimut strain, was visited. Mr. A. J. Simpson, of Clifton, Hamilton, is the owner of this splendid herd of massive, deep, yet refined, Shorthorns, all very high-class stock indeed, and limited in numbers. Prices rule higher than most, 100 to 200 guineas, save for a few which it may be inferred are of less merit. Mr. John James, at Derrimut, Coloc, possesses the original strain of Derrimuts in a herd of some 40 breeding cows. This is a magnificent collection of animals of the most ancient and best lineage, perfect specimens of the finest beef Shorthorn type. The numbers available for sale at any time are limited, and young bulls could be had for about 40 guineas; two-year-olds, when there are any, for about 70 guineas. Lately Mr. James has been using an Angus bull, a white one, but the progeny is more



Stud Shorthorn Cows and Calves, the property of Mr. John James, Derrinut,
Coloc, Victoria,



Group of Stud Shorthorn Cows, owned by Mr. A. J. Simpson
Clifton, Hamilton, Victoria,



Champion Shorthorn Bull, the property of Mr. A. J. Simpson,
Clifton, Hamilton, Victoria.



A group of young pedigreed Shorthorn Bulls, owned by the Angas Trustees,
Point Sturt, South Australia.

generally red or roan than white. Branches of the same strain were also visited and admired on the farms of Mr. Cecil Parsons, Watchill, Coloc, and of Mr. E. Robertson, of Reccarton, Alvie. To describe these herds would be largely repetition, but by seeing so many the proper impression of the type and of the possibilities of getting stock was conveyed, and some standard for comparison and remembrance secured. Yet another well-known herd of beef Shorthorns is that of the trustees for the late Mr. R. Howell, in the hands of Mr. J. H. Harding, on Chocolyn, Camperdown. This herd has been on the station for 70 years, and contains much Bolinda Vale blood. About 40 cows are being entered in the Shorthorn stud book, and the stud herd is being built up and augmented. The characteristics of this herd are a large roomy frame, and heavy weights adapted for the very rich pastures and easy conditions under which these animals exist. After careful scrutiny of these herds, whilst expressing the greatest admiration of them collectively and individually, and appreciating the obvious skill in breeding and rearing them, I have formed a personal preference for *Rhodesian conditions* for the Angus type seen in South Australia, as against that of the Derrimuts. Condemnation is out of the question, and the expression of a general preference in no way detracts from the recognition of the superlative merits of both. Any would be welcome in Rhodesia.

With the rapid growth of the dairy industry during the last few years, the milking qualities of the Shorthorn have become a feature of more concern with the average farmer than the beef qualities. The milking type of Shorthorn is therefore rapidly coming to the front. In this connection, the Lincoln Red has met with little favour, and is almost unknown; the few representatives that have been imported have been perhaps somewhat unfortunate. There are a score or more breeders of pure milking Shorthorns, and of the best of these, four herds were examined. The cattle in question are pure Shorthorns, not crosses such as were seen elsewhere, and had by no means lost their beef attributes, whilst giving very high returns at the pail, both as regards quantity and quality. Messrs. Lidgett, on two neighbouring farms near Bacchus, Marsh,

possess excellent herds of milking Shorthorns. Selection by performance is to some extent followed, and cows at the first calving that fail to give three gallons of milk (18 bottles) per diem are discarded or given one further trial, whilst older cows must yield four gallons. Two-year-old heifers of this description may be had for 15 guineas to 20 guineas, and yearling bulls for 15 to 20 and 25 guineas, and up to 40 guineas. Mr. W. T. Manifold, at Purumbete, near Camperdown, possesses a herd of 800 cows, which average about 4 gallons of milk, yielding 4 per cent. butter fat, providing about one and a half pounds of butter per day each, and running throughout the year on rich grass pastures with a minimum of other feed. Out of these, a stud herd is maintained, from which bulls fetch up to 50 guineas, and I saw several such that would have suited Rhodesia. Victorian breeders of Shorthorns whose names were given to me as amongst the more prominent, but whom I was unable to visit, included Mr. A. J. Webb, Rathfarnham Hillside, in Gippsland; Mr. Donald Stewart, of Wonger Skipton, for beef types; and Mr. W. Dugdale, Clifton Vale, Myrning, Bacchus Marsh, and Mr. P. Chornside, The Manor, Werribee, for milking Shorthorns.

The Hereford is hardly so well represented in Victoria as is the Shorthorn, yet there are splendid herds and magnificent individuals of this breed, the young bulls being sought after for use on the cattle runs of the north. The growth of the dairy industry along the coast has discouraged these breeds locally, as it is essentially of a beef form, despite the claims of some of its advocates in respect of milk. The principal breeder of Herefords in Victoria is perhaps Mr. John A. Beattie, of Gisborne Park, Gisborne, though there are others of note also. I inspected Mr. Beattie's herd, and was much impressed with it, and saw several of the class which might advantageously be brought over, procurable at prices varying from 20 to 40 guineas, frequently 30 to 35 guineas, and somewhat more, say, 70 guineas, for animals intended, and in course of preparation, for the shows. The accompanying photos convey but a faint idea of the beauty and character of this herd, which impressed me most favourably.

I also visited Nuendal, the property of the Hon. S. Winter Cook, near Hamilton. On an estate of 20,000 acres of splen-

did rolling country, covered with short dense grass, and studded with plantations and lakelets, amid most ideal conditions, I found 200 pure-bred Herefords, based originally on the best English blood, and subsequently influenced by bulls from New Zealand. All are quite pure, and a hundred or so are pedigreed. The bulk of this herd was to be dispersed, and only the best retained for stud purposes. Bulls are to be had at 20 to 25 guineas. The photographs of this herd give a slight impression of the type, both of the bulk of the herd and those selected for stud use. Mr. W. H. Yelland, of Eagle Farm, Newlyn, is a prominent breeder of Herefords, whom I was unfortunately not able to visit.

The favourite dairy breeds are the Ayrshire and Jersey. Ayrshires are used pure or crossed with Shorthorn, and are perhaps the most popular type in Victoria. There are some half dozen leading breeders of Ayrshires in Victoria, and a number of others of lesser note. Opportunity offered of visiting only one, Mr. W. P. Brisbane, of Gowrie Park, Weerite, who, however, stands amongst the foremost; his herd has been in existence over 40 years, and comprises 30 to 40 pure pedigreed cows, formerly all in the Scottish, now transferred to the Australian, herd book. The herd is of very superior and handsome quality, and maintained constant to the original type, without those changes of fashion which have characterised the history of the breed in Scotland. The male progeny sells readily between one and two years old at about 20 guineas, whilst outstanding individuals fetch more. Mr. Brisbane holds an unsurpassed record in the show yard, while the herd is kept in most natural, wholesome open conditions. It was a real pleasure to see a herd of such high refinement and vigour combined, the outcome of prolonged judicious mating, coupled with reasonable natural treatment and exposure to the rigours of weather and season, to promote hardiness and maintain stamina. Other breeders of pure Ayrshires whom, however, I could not visit, are Messrs. McNab Bros., Oakbank, Tullamarine; A. T. Prostley, Glengarnock, Yannathan; A. E. Selman and Bros., Willowvale, Ferntree Gulley; G. E. Wilson, Wilson House, Berwick, and the Misses Grant, Seafield, Tullamarine.

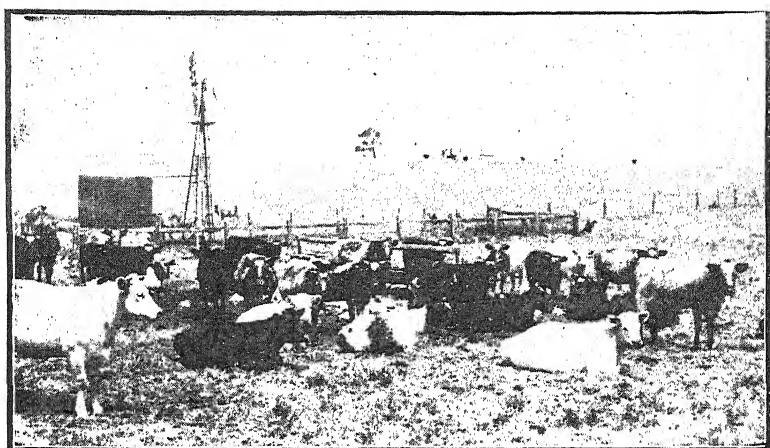
Jerseys, though less popular than Ayrshires, are not uncommon, and thrive amid dry and poor conditions to a remarkable degree, especially when we consider their productivity and the favourable conditions in a genial insular climate under which the breed was originated and fostered. There are, however, a very limited number of pure Jerseys, only three of note.

Red Polls were heard of on three farms in Victoria, where the Government is experimenting with the breed as a dual purpose animal, and on one or two farms in New South Wales. A very few Guernsey Kerry and Dexter Kerry cattle are to be found. Similarly, there is in Victoria only one herd of about 20 head of South Devons, that of Mr. A. S. Chornside, Corogulac, Coloc, more of an experimental character than anything else. There are no breeders of Sussex cattle at the present time in Australia and New Zealand.

In Melbourne there are a number of firms able and willing to act as buyers on commission, and familiar with the markets, and able to lay their hands on stock suitable to requirements. I visited a number of these firms and learned details of the usual procedure.

SOUTH AUSTRALIA.—Agriculture is very highly developed in South Australia, especially arable farming, sheep-raising, and dairying in certain parts. As in many other old or settled countries, the advance of civilisation has driven ranching back to the more remote parts, hence, although the stockyards of Adelaide are one of the greatest centres of the trade in slaughter stock in Australia, yet cattle breeding is not largely followed in that State. The latest returns give the number of cattle in South Australia at 384,862 head. There are also comparatively few breeders of high-class stock, four or five perhaps for each of the Hereford, Shorthorn and Jersey breeds. This somewhat surprising state of affairs is the more curious that in this State should be found two of the largest herds of pure-bred stock and the highest reputation in Australia.

The situation, from a veterinary point of view, in South Australia is eminently satisfactory. There is no black quarter, no nodular disease, and also no redwater. Only two or three occurrences of contagious abortion, and these nowhere



The 1910 drop of pure bred Shorthorn Heifers on the Point Sturt Estate, the property of the Angus Trustees, South Australia,



Dairy Shorthorns, with milking shed and silo in the background.
The Government Experiment Farm, Hermitage, Warwick, Queensland,



Group of noted Shorthorns, the property of Sir Rupert Clarke, Bart.,
Bolinda Vale, Victoria.



Group of pedigreed Shorthorn Cows, owned by the Angas Trustees,
Point Sturt, South Australia.

near the chief breeding herds, have been recorded, whilst actinomycosis is very rare. Pleuro-pneumonia is no longer indigenous, and outbreaks due to stock brought in from other States are very exceptional. The general health of stock is excellent and the veterinary administration adequate and efficient. A very complete system of inspection at saleyards and abattoirs is maintained, and serves to bring to light any disease that is about. Laws regarding these matters are very stringent. The two leading herds of Shorthorns and Herefords in South Australia are both the result of the foresight, enterprise and skill of one man, the late Mr. J. H. Angas, who established them over forty years ago, and arranged for their maintenance for a period after his decease. The herds are now under the control of the trustees of his estate, who have maintained them in the highest state of excellence.

The Hereford herd visited on the Hill River property was founded in 1869 by the importation from England of a number of very high-class animals, and has since been maintained by the selection of the best stock procurable. The herd has been very carefully maintained at a very high pitch of excellence, and now numbers some fifty breeding cows, all of surpassing merit. The characteristic of this herd is the combination it shews of symmetry, substance and style. The whole herd is marked by every indication of a tendency to lay on flesh, accompanied by abundant stamina, and a vigorous but gentle disposition. An extraordinary degree of perfection of breed-characteristics has been achieved in this herd, which is kept under rational, free and natural conditions. The prices of young bulls from this herd prepared for shows run into high figures, but excellent representatives, and a class strongly to be recommended, are procurable at about 25 guineas, others about 50 guineas, and heifers about 12 guineas, and exceedingly well worth it. Herefords are also bred by the Hon. G. Riddock, Koorna; Messrs. P. Charley, Narrung and Keith at Bourman, Paltalloch, but I had no opportunity of seeing these herds.

The great herd of Point Sturt Shorthorns, the property of the late Mr. J. H. Angas, and now in the hands of his trustees, ranks amongst the foremost of the breed anywhere; indeed, it is a question whether in America or England a herd of

equal size and quality is to be found. Certain of the famous old English strains of Bates and Charles Colling formed the basis of the herd nearly 70 years ago, and the strain has been preserved with but little change ever since. The natural and healthy conditions under which the herd has always been maintained have enabled close breeding to be followed, without any loss of vigour or size, and have brought about a trueness to type which is remarkable. The whole herd are characteristic of the Bates strain; massive, wide, level and handsome, full of force in the males, and quality and sweetness in the females. The high merit of every individual in the herd, their close resemblance one to another, and the uniformity in appearance of the whole of each year's drop are extraordinary. Shorthorn bulls from this great herd of over 400 head may be had for about 30 guineas, others for 50 to 75 guineas, and fancy prices for the pick; female stock at similar, but not lower figures. Other South Australian breeders of pure Shorthorns are the Canowie Pastoral Company, Limited, Canowie; and Mr. A. P. Bowman, Campbell House. Jersey cattle, chiefly somewhat cross-bred, are met with very generally throughout South Australia; the principal breeders of pure stock of this breed include Messrs. Lawton and Co., Rounsville, and A. J. Murray, all near Adelaide; also Messrs. Taylor, of Qualer, and Popen, of Piles Farm, Plympton.

There are several firms of repute in Adelaide prepared and able to buy and ship cattle.

TASMANIA.—Tasmania is a relatively small State, and the number of cattle small—217,406 head—about equal to that owned by Europeans in Rhodesia. Less attention is given to the breeding of pure stock than might be expected, except merino sheep, for which the State is noted. Dairying with mixed herds containing a large infusion of Ayrshire blood is practised on a large scale, especially on the N.W. coast, and close to the towns, but otherwise the Hereford is the favourite breed. Breeders of stock of undoubted purity and the highest quality have relied upon their local reputation, and have not entered their cattle in recognised stud books. Buyers knowing them have been entirely satisfied with pedigrees taken from the private herd registers, in some cases going back twenty generations to the original imported stock. Excellent pure-

Bred animals with records of this sort are to be obtained, but there would be difficulty if more formal pedigrees were insisted upon. Such stock is, however, amply good enough for putting to native or cross-bred herds, the purpose generally in view in Rhodesia. I personally saw four of the most noted herds in the country, and was fully satisfied that stud stock suitable for Rhodesia and of excellent quality was obtainable at reasonable prices, somewhat lower than on the mainland of Australia. Really good bulls of Shorthorn, Hereford, Aberdeen-Angus, Devon and Ayrshire breeds can be got for about 15 to 20 guineas. There are only about a dozen breeders of repute in the Island who divide these four breeds amongst them, so that the numbers available at any time are very limited. Pure-bred two-year-old heifers may be bought for £6 and £7, but to this must be added cost of transport and inoculation treatment. In price, the stock of this type which I saw compared not unfavourably with pure-bred heifers in the Australian States, for which 20 to 25 guineas was asked, but which again were of registered pedigree, and of the best and most ancient lineage.

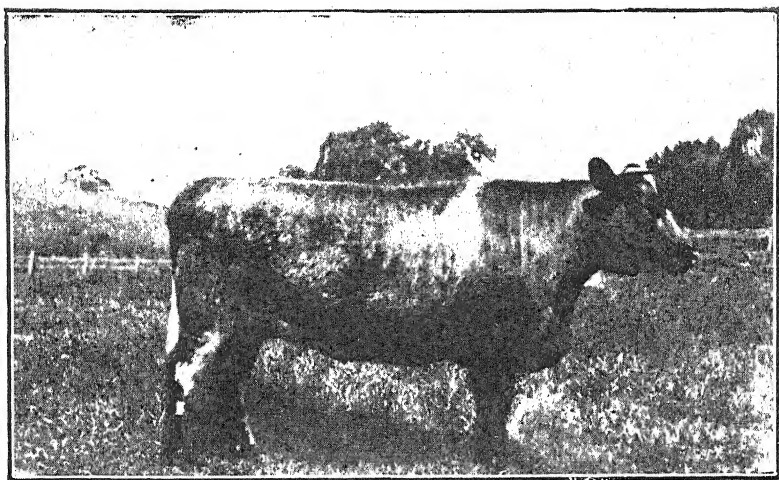
The Tasmanian Woolgrowers' Agency Co., Ltd., of Launceston, may be mentioned as reliable agents, familiar with local conditions, and having at their command the services of competent buyers.

Tasmania is an extraordinarily happy land in its freedom from contagious diseases of cattle; pleuro-pneumonia, red-water, and nodular disease are unknown, whilst other diseases cause no serious losses. One outbreak of anthrax only has been recorded. This was the first State visited on my trip, and I was at once impressed with the fact, confirmed throughout the remainder of the tour, of the natural and healthful conditions under which stud cattle are reared, grass fed throughout the year, with generally such shelter only as trees and the contour of the country affords, unforced, out day and night, and running by themselves in paddocks without pampering. Only animals intended for the show-ring are taken up for a few months, housed, groomed, and fed, and even then not to any undue extent.

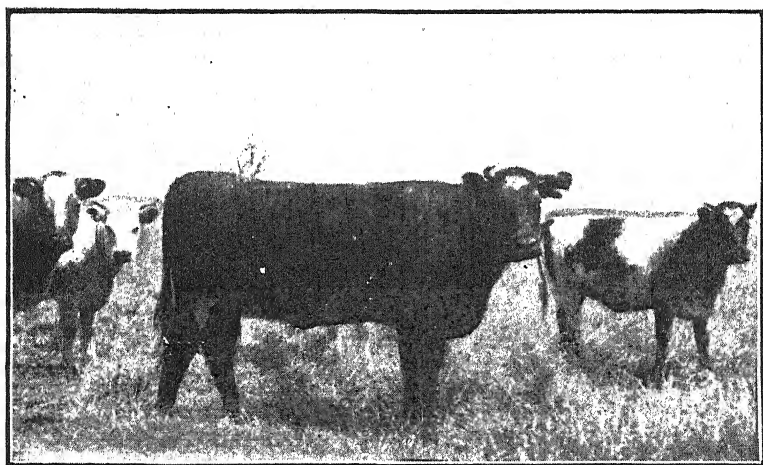
On the Bellevue Estate, famous also for its merino stud flock, Mr. Thomas Muirhead, Manager for the Gibson Estate,

has a herd of some 200 pure-bred Herefords, young bulls from which command a ready sale as yearlings for about 15 guineas, whilst similar heifers cost about half that sum. Being sold quite young, it is somewhat difficult to judge of the relative merits of the individual animals, but this risk is of little moment after an examination of the whole herd, which is of a uniform high quality. A few of the very best are kept apart as a stud, to provide sires for the main herd. Unfortunately, the numbers available are small, perhaps half a dozen of each sex at any one time. Other prominent breeders of Herefords whom, however, I was unable to visit, are Mr. John Taylor, of Winton, Campbelltown; Mr. D. MacKinnon, of Evandale, Dalness; and Mr. M. MacKinnon, of Mountford, Longford. The Devon breeder of chief repute in Tasmania is Mr. C. B. Grubb, of Strathroy, near Launceston, whose herd is of very good quality, with some members pre-eminently so, and the whole true to type, and with a family resemblance often lacking in English herds of this breed in which the characteristics required are somewhat elastic and the gradations between the types of North Devon, Dorsetshire, Somersetshire, and between rival breeders somewhat marked. On the occasion of my visit, I saw four yearling stud bulls at about 15 guineas, two two-year-olds at 20 guineas, and eight yearling heifers at £6 to £8. Aberdeen-Angus cattle are scarce, the only breeder, Mr. W. B. Grubb, of St. Leonards, and brother of the above, having a small number of a very fine class indeed, surprisingly so, and the only ones met with throughout my whole trip, the breed not being well known nor popular in Australia, in spite of the high quality of beef it produces.

ENGLISH AND AUSTRALIAN STUD STOCK COMPARED.—It may be helpful to give some indication of Australian stud cattle, as contrasted with those from the British Isles, of which breeders in Rhodesia have experience. In this connection I exclude from my purview the very best prize-winning Australian individual animals, as they are of a class distinctly superior to what we have had or indeed want from England, and I may except too a few special importations from Home; also it may be understood I am not referring to the common cattle of the country. The pure-bred bulls and heifers in South Australia, Victoria and Tasmania which I saw and deemed suitable for



Bolinda Vale Duchess of Derrimut 247.
Shorthorn Heifer, owned by Sir Rupert Clarke, Bart., Bolinda Vale, Victoria,



Shorthorn Cows, owned by Sir Rupert Clarke, Bart., Bolinda Vale, Victoria,

our purposes in Rhodesia were point by point as good as what has been imported from England, but they are in certain respects different. The changing fashions and extreme types which have influenced breeding at Home have been much less in evidence in Australia, where the breeds are less altered from the old forms. No doubt to some extent changes of type indicate evolution and development towards higher perfection, yet this has undoubtedly frequently been achieved at a cost of constitution, and often merely represents a transient fancy. This is particularly the case with Shorthorns, and I must express great admiration and a decided preference for the Australia type. The impression left by the examination of whole herds is one of great vigour and activity, combined with massive form, width, depth and amplitude. Great frames are set on short legs, yet style and character are very apparent. Whilst the symmetrical smoothness, placid mien and perfection of detail of English stock may be missing, yet the valuable cuts are well developed, and in firmness of flesh, mellowness of skin and touch the Australian Shorthorn leaves nothing to be desired. The same remarks hold good of the Herefords, which are full of character, true to type, deep, wide and fleshy. It is interesting to note that the highest authorities in the Australian stock world regard the Hereford as hardier under adverse conditions and of better quality meat than the Shorthorn, although lighter and slower maturing. Quality of beef is not, however, a great consideration to the freezing and canning works.

A great point in favour of Australian cattle is the natural condition under which they are reared, grass fed, free in paddocks all the time, without cake, spices, condiments, blankets, and grooming or forcing of any kind. Raised under these sound and healthful conditions, the young stock are well grown and well nourished, and are not apt to suffer any check when taken to new surroundings. Only the best of the year's calves, intended for the great showyards, are taken up and hand fed, and that not to the extent that is customary at Home. This fact impressed me in every herd visited.

In brief, there is in Australia a class of stock as good as what we have had from England, and better, also cheaper.

A drawback to purchase of Australian stud cattle is the fact that so many good animals are not entered in the herd books, even when their ancestry entitles them thereto.

Accustomed as we are to insist upon a registered pedigree in buying cattle from England, and more recently also in South Africa since the establishment of stud books here, it is surprising to find so little importance attached to this particular throughout Australia. Other enquirers on missions similar to mine visiting Australia from the United States, Peru and Java appear to have remarked on this fact also. The private records of breeders, many of which date back thirty and forty years, have in the past sufficed for local requirements, but foreign buyers demand some more formal guarantee of the purity and ancestry of what they are buying; and, although it may be actually no more reliable than the other, yet strangers not unnaturally seek official documentary evidence on the point. Australian cattle breeders point to the Merino, which has attained to so great an eminence and perfection without the aid of public stud books; but the cases are not parallel. In the case of sheep, maturing so much more quickly and being so vastly more prolific, as well as carrying their character so clearly marked in their fleece, there is less need of written records than with cattle. For some years past, however, societies representing the different breeds have been working in this direction, and now cattle with the most aristocratic pedigrees are obtainable in Australia, although the bulk of the pure-bred stock is still not entered in these records. The Ayrshire herd book has been published since 1892, and runs into six volumes and numbers. A Jersey herd book, published in Sydney, has also been in existence for a number of years. For Shorthorns, the first volume of a herd book, framed on the lines of the Coates herd book and based on private records and sworn affidavits, is now in course of preparation. Societies have been formed to encourage systematic breeding of the so-called dairy Shorthorn and the Illawarra cattle, both of which types are of recent origin and contain strains of Shorthorn, Ayrshire and Jersey, and can by no means be regarded as fixed breeds. The Hereford breeders throughout Australia have combined and registered their stock in a herd book conducted in Queensland. For grading up native herds in Rhodesia the importance of an illustrious pedigree may readily be exagger-

ated. For our purposes it is sufficient that a bull is of pure breed and has come of good stock for a long time back, and this assurance it is possible, from existing records, to obtain in Australia.

Cattle from South Australia, Victoria and Tasmania, on arrival, would have to be subjected to precisely the same inoculation treatment as those from England, and would be subject to the same conditions as to tuberculin test and certificates of origin and health. It may be mentioned that the diseases reported in Australia are found usually in the remote parts and in the dairying districts, not amongst the stud herds nor in those localities.

Cattle from Australia may be expected to feel the change of climate here (as it is not dissimilar to their own) less than stock from England, and there is no reversal of seasons, as there is in the northern hemisphere.

As compared with England, the selection in Australia is limited to much smaller numbers. Yet the numbers are sufficiently large that the entry of Rhodesian buyers into the market will not be likely to influence to any extent the price of breeding stock in Australia, and the supply is ample for our present needs.

The purchase price to be paid has been indicated above. This varies but little from time to time, but there are seasons when stock of certain ages are more readily procurable, as the calving time is from September to December inclusive, and the great annual shows at Adelaide, Melbourne and Sydney are held about Easter and onwards. Individual animals can, of course, be got at any price, and the figures quoted are only general indications of what must be paid for good sound animals of purity and quality.

From the appended statement it will be seen that the cost of importation is approximately £24 per head, to which must be added the cost of inoculation (about £10), and these sums, added to the original purchase prices as indicated above, will give some idea of landed cost of cattle imported from Australia.

*Estimated Cost per Head of Importation of Cattle from
Australia.*

	£	s.	d.
Prime cost, say	26	5	0
Railage to port	0	10	0
Tuberculin test	0	7	6
Freight to Capetown	8	0	0
Railage from Capetown to Salisbury ...	5	10	0
Share of wages of two stockmen for 2½			
months at £10 per month, with £10			
each for expenses, divided over 50			
head; and return fare for above at			
£30 each, divided over 50 head ...	2	12	0
(In case of smaller numbers there are similar charges.)			
Feed for 22 days at 2s.	2	4	0
Insurance for voyage at £5 5s. per cent.	1	5	3
Insurance overland at 27s. per head ...	1	7	0
Feed for 6 days in train at 2s.	0	12	0
Charge to cover commissions, exchange			
and administration expenses, 50 per			
cent. on £50	2	10	0
Cost of inoculation at Salisbury	10	0	0
<hr/>			
Total	£61	2	9

Hints on Planting an Orange or Lemon Grove.

By CHAS. E. FARMER,

Citrus Adviser to the British South Africa Company.

Having selected the site on which to plant a grove of orange and lemon trees, it is just as important to prepare the land for the reception of the trees as it is to prepare land for the planting of mealies or any other crops. The idea that a small tree only needs a few feet of cultivated soil for the first year or two and by working a space around each tree, increasing it year by year, that the tree would thrive as well, has been proved to be a fallacy. Where these fruits are grown as a commercial business it has been found more beneficial to the trees, and more economical to the grower, to thoroughly prepare the whole of the land before planting. If the site is virgin soil, it should be cleared of all trees and brush sufficiently well to allow of its being ploughed deep enough to turn under the grass or natural growth upon it, and long enough before planting to permit this growth to rot to some extent before reducing the surface to a fine tilth with a harrow or cultivator. By this the labour of staking out the land and planting, in addition to the immense benefit to the trees gained by being planted in land recently worked and in a good state of cultivation, is largely reduced. I often see young trees set out in rough uncultivated land. Usually they are planted too high or too low, owing to inequalities in a natural ground level, and the difficulty is of knowing just what that level is until the whole site has been cleared and worked up. They are irregular in the rows, they stand in weed and tall grass as high as themselves, and their foliage becomes a prey to every leaf-eating insect and pest of the veld.

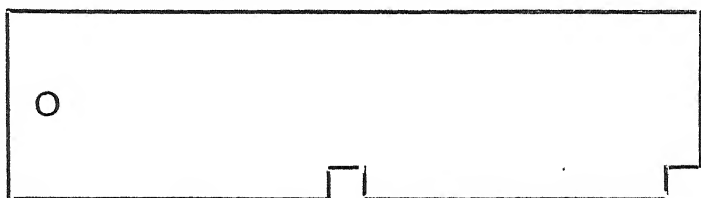
The land having been broken up by deep ploughing, and put into a first-class state of tilth, the next step is to stake it out. Too much care cannot be given to getting the trees in straight rows, and every tree in its exact position in its row. If an orange tree is not attacked by disease, and is undisturbed by climatic influence, its age is practically unlimited, and any

defects in the original planting of the grove give it an unbusiness-like appearance. It remains an eyesore for many years afterwards, and often proves a great inconvenience in future ploughing and cultivation. For oranges and lemons budded on to the wild lemon stock, it is well to allow 24 or 25 feet each way. On this stock they make rather a larger and faster growing tree than when budded on the wild orange, especially the Washington Navel and Valencia Lates, which are free growing varieties, and I prefer to lay out the land "on the square," which gives an equal distance between the trees every way, and enables the grower to plough and cultivate his grove in four different directions.

There are other methods of arranging the trees, but this is the simplest. Procure as many stakes as there are trees to be planted, unless the grove is to be a large one, and for convenience of sighting, these may be dipped at one end in white-wash or white paint. These stakes should not be less than 4 feet long. The first, or base line, should be established running parallel in the direction it is wished the grove should take, and a stake placed at each extremity. A corner should then be established, by going to one end of the base line and measuring off 80 feet along that line. Place a stake to mark the spot. Start again from the same end of the base line and measure off 60 feet at a right angle to it and set another stake. The distance between these two stakes should be just 100 feet. The 60 feet stake may require to be moved a little from where it was originally placed, and when it is just 60 feet from the base line and 100 feet from the first stake, the two lines will be exactly at right angles to each other. Continue the line to the 60 feet stake as far as it is wished to carry the grove; set up a corner stake at each extremity, and square that corner in the same way. The other two lines may be laid off, and the corners squared likewise. The four corners of the grove being thus accurately established, take the tape line and, commencing at the original corner, measure off along the line the distance at which it is desired to set the trees, placing a stake to mark each spot where a tree is to be planted. Care should be taken to keep these stakes in a true line, by sighting from the corner stakes. Having done this on all four sides, no more measurements are necessary. The inside stakes are all quickly and accurately placed by one man, while two men direct him

by sighting, one from each direction. It is not necessary that the inside stakes should be as long or straight as the outside rows. The man placing them by the directions of the others sighting for him can carry one good straight stake with him, and when he has given the position for it, a shorter or more crooked stake can be placed in position. It is only necessary that the bottom of the stake should mark the exact spot in the ground. When the planting board is used for actually setting up the trees, the latter will be in correct line. If the prospective grove is too large for a man to sight across it, a section of it may be laid out as above. The lines of the laid-out section will then be the base of the remaining sections. If the work is done carefully, and the original measurements taken accurately, the whole will ultimately line up in all four directions.

The land is now laid out, and a stake marks the spot where each tree is to stand. Before the hole can be dug, it is necessary to remove the stake. In order to get this back into its exact position, a planting board must be used. This is a very simple affair, and requires only a board about 4 inches wide and 5 feet long. A hole is made with an inch auger at one end, and a notch cut out of the other end. Midway between these two, and on the edge of the board, another notch is cut. A wooden pin is made to fit the auger hole long enough to go through the board and pin it to the ground; another pin is made to fit the notch at the opposite end thus :—



Place this board on the ground with the tree stake in the central notch. Place the pins in position, one through the hole and the other in the end notch; then swing the board on the pin to one side, remove the stake and dig the hole. When finished, swing the board back into position and replace the tree stake in the central notch as it was before. In digging the hole, be careful to throw the earth to the side where it will not interfere with swinging the board back into position. If the whole field has been thoroughly and deeply prepared, as it

should have been, it will only be necessary to dig holes large enough to take the roots without cramping. Nor need the hole be deeper than is necessary to admit the tap root. In fact, to disturb the soil immediately beneath the tree to a greater depth than the whole has been disturbed in ploughing, and will be disturbed in future ploughings, is considered as likely at some time to be injurious to the health of the tree, for the reason that in excessively wet seasons the water will drain from the surrounding space and form a lodgment beneath the tree instead of draining away from it. As to how particular one should be on this point, depends a good deal on the nature of the soil being planted. If the natural drainage is good, or if the sub-soil contains gravel, there is little danger of the ground becoming so saturated as to cause any danger. On the other hand, in low flat lands with a stiff sub-soil, the ground may easily in some rainy seasons become water logged, and lodgments of water remain for some time wherever it finds a spot to drain to. If those spots are immediately beneath orange and lemon trees, disease may be the result. Some men of long experience, especially in Australia, condemn the practice of digging holes at all and advocate the planting of trees on the cone system. This is done by taking out the soil round the stake with a hoe, the hoe striking the top of the soil at the stake and getting in deeper, until it takes out about 6 inches at the outside of the hole, which is like planting on the top of an inverted saucer. The space for the tap root is made by splitting the ground with a spade, the lateral roots being spread out over the cone. Another method often adopted by amateurs and those who have not given much thought to the subject is to dig a hole of large circumference and depth and to fill it with the richest soil at their disposal, mixed with cowpost or manure. The citrus tree planted in this of course grows and thrives amazingly for a limited time. Its roots confine themselves to this rich spot, but eventually, especially if the site of the grove is on naturally poor soil, the tree becomes in a manner "pot bound" and ceases to grow and thrive. This system may answer for a short-lived tree, as a peach or a Japanese plum, but for a long-lived tree attaining the size of the orange, and bearing fruit indefinitely, and sending out a large root system, the practice is one to be condemned.

The inherent fertility of the soil is what must be depended upon, and the roots should be encouraged to spread and seek

their nourishment and moisture at a distance. Any aid which is given artificially should be done by scattering manure or commercial fertilisers on the surface not nearer to the trunk than the spread of the foliage of the tree permits, and working these in with the cultivation of the grove. Citrus trees are surface feeders, and there need be no fear that their mass of fine fibrous roots will not find nourishment applied in this way.

The best time to lift trees from the nursery and plant them out in the grove is when the cool season is over and before the trees begin to put out their first spring growth. This first growth is the best the trees make in the season, and if they are planted out in time for them to make it in the grove, it is so much gained, and they have the whole of the growing season ahead of them to become firmly established before another cool season comes round. They will also be in better condition to resist the attacks of the various pests which prey upon them later in the summer. The early spring being so dry in Rhodesia, some growers may prefer to wait until the rains begin in October or November, and avoid the watering which would have to be done to the earlier planted trees. In this case, the trees should be dug from the nursery after they have finished growing for the time being, and when the last growth is fairly well hardened up. If the trees are moved in this condition there should be very little, if any, loss. If taken up when actually in vigorous growth, the loss is likely to be very much greater. No advantage is gained in moving trees when summer is over. There is then no season left for them in which to recover and put on any strong growth before the cool season arrives, and they will be in a weakly condition to resist any frost which may occur. Rather than move them in the late summer, I should prefer to do it in the winter, when they are dormant, and will remain so until the spring. Citrus trees can be transplanted at any time, but some times are better than others.

In setting the trees, the planting board will again be required. Place it on the ground as before, with the tree stake in the central notch, and remove the stake. Take note of the mark on the tree shewing the level at which it grew in the nursery. Hold it in the central notch with this mark level with the underside of the board, and with the right hand take hold of the bottom of the tap root. When the first shovelful of earth is put in take care to firm it well underneath, and round

the base of the tap root, in order to prevent the tree from sinking after it is planted. Take care to see that the portion of the tree as high as the union of the bud and stock is quite upright. It will not matter if the budded portion appears to bend out of the perpendicular, as it will do, unless the trees have been very carefully trained in the nursery. Having set the tree so far, the planter should put the earth into the hole gradually, and not faster than he can conveniently use it. The earth should be firmed well round the tap root, and the lateral roots spread out and covered at the level they branch out from the tap root, and with a slight tendency downwards. Continue this until the whole root system has been disposed of, then remove the board and fill in the hole to the natural ground level. If the weather is dry, give the tree a bucket of water, but, before doing this, it is well to draw the soil up in a ring round the tree to confine the water. With citrus trees, it is most important that they should not be planted deeper than they stood in the nursery. Many trees are killed by disease, and many have their growths stunted, from being set too deep or from being loosely planted, which causes them to sink as the soil settles. It is important in Rhodesia, where a prevailing wind blows from one quarter for a large portion of the year, to plant the tree with the budded portion facing the direction of the prevailing wind. This is easily done if the planter notices the mark at the union of the bud and stock left by the removal of that portion of the original tree above the union by the nurseryman. When placing the tree in the notch of the planting board, care should be taken that this mark faces the direction opposite to that from which the prevailing wind blows.

If the trees have been out of the ground some time before planting, it is well to cut off the tips of the main roots before planting, and any roots that are bruised or broken should be cut back to sound wood. Use a sharp pair of pruning shears and make clean cuts. The amount of pruning necessary to be done to the tops at the time of planting depends on how severely the roots have been cut back in taking the tree up at the nursery. If only short roots remain, cut back the main stem or leader of the tree, and the side branches more or less severely, to correspond with the injuries sustained by the root system. Always cut back to a bud or small branch if possible.

Notes on Cattle Breeding.

PART II.

By R. C. SIMMONS.

The writer is indebted for assistance and criticism in compiling these notes to Messrs. C. S. Jobling, St. C. B. Gwynn, O. Zimmerman, Harvy and Anderson, Glanfield, Ll. E. W. Bevan and others.

THE SUSSEX BREED.

A very interesting and exhaustive article on this breed by Mr. Ll. E. W. Bevan, M.R.C.V.S., appeared in *The Rhodesia Agricultural Journal* for June, 1910, but for the benefit of those who may not have seen that number, it will perhaps be as well to note a few characteristics of the breed. The Sussex is one of the hardiest of British breeds. It is purely a beef animal, and was amongst the last of British breeds to be used for draught purposes. It has for generations been bred under conditions closely approximating to those of nature, and the custom in its native district has been to let the calves run continually with the dam, so little is it regarded as a milk breed.

The fact that it has survived as the most suitable type of draught ox in the heavy clay lands of Sussex is sufficient evidence of its constitution and vigour. In colour, a dark red with white hairs in the brush of the tail, it closely resembles its near relative the North Devon. It is, however, a darker red, at times almost plum colour, and the characteristic mottled skin of the Devon is absent. The horns of the bull are usually thick, of moderate length, and curved outward and forward. Those of the cow are lighter, and curve forward and upward. The breed lacks the quality and neatness of the

Devon, but makes up for this by increased size and weight. It has a reputation for extreme hardiness, weight for age, early maturity, and a large proportion of carcase to live weight. The breed is not a very numerous one, and it is only recently that it has been brought prominently before the foreign public. It appears to have increased in popularity during the last two years, with a consequent increase in the price of good bulls. The perfectly finished and extremely early maturing beef carcase which is the outcome of high feeding and careful artificial selection will not be found in the Sussex. It would, however, appear to combine the desirable qualities of the modern beef animal with the hardiness and suitability for trek purposes of the Africander, in a very marked degree. The Sussex herd book was established about the middle of the 19th century, but long before that the breed appears to have been kept pure. It is, therefore, well able to stamp its characteristics on its half-bred progeny.

The writer is of opinion that the Sussex breed is well deserving of attention as a ranching animal on the poorer and more exposed soils of Rhodesia. Although its chief value lies in its hardiness and suitability to present day ranching conditions, the records of the breed in more recent years shew that it responds handsomely to greater care and more artificial feeding. At the time of writing, very few, if any, Sussex animals are obtainable from the open areas of the Union, and breeders must look to the Old Country for some time to come as a source of supply.

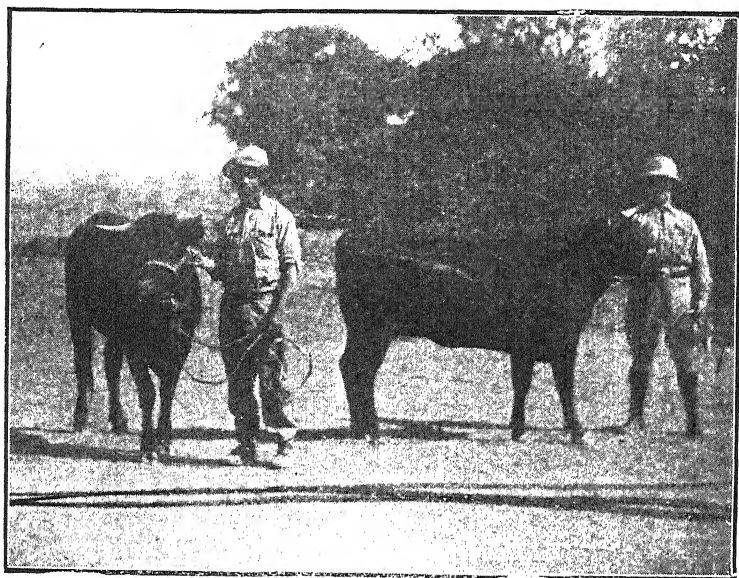
The principal herds in England are to be found in the counties of Kent, Sussex and Surrey. One Rhodesian breeder, namely, Mr. Glanfield, of the farm Ballincety, near Salisbury, has imported a number of pure-bred animals of both sexes of great quality and merit, and no doubt he will be able to supply both pure and half-bred bulls in the near future.

THE HEREFORD.

The Hereford breed of cattle has in all probability sprung from the same origin as the Devon and the Sussex breeds, but has been developed on different lines from either for a couple of centuries or more. The result is that it now possesses greater size than the Devon and more quality than the Sussex,



A good type of Sussex Bull.



Sussex Heifers.

while it has at the same time retained the hardiness of both in a great degree. In the early days grey seems to have been an admissible colour in the breed, and speckled or mottled faces were common in quite recent times. The universal and strikingly characteristic markings of present day specimens of the breed appear to have originated in some cattle which were imported into Herefordshire from Flanders in the early part of the 17th century. Be this as it may, the Hereford breed of cattle to-day is invariably red, varying from medium to dark, with white face and brisket, white on the underline and flanks, and sometimes on the legs, a white brush to the tail, and usually, in bulls, a white line or mane extending along the poll to the withers. In some strains red patches occur round the eyes. The horns of the bull usually have a downward and forward curve, but are sometimes horizontal. Those of the female curve upward and forward, but are not "cocked." A good coat and a skin that handles well are essential features of the pure-bred animal. The breed possesses all the characteristics of the beef-producing animal in the wide forehead, short and slightly dished face, wide back and quarters, and general blockiness of outline.

South African bred Herefords often appear (to use a breeder's expression) light in the breaching. This, I think, is sometimes more apparent than real, as the breed develops very fleshy "pig" hams when fat, and when in poor or moderate condition appears deficient in this point. Of course, no beast with narrow quarters will ever correct the fault by laying on flesh.

The great value of the breed lies in the fact that the early improvers aimed unswervingly at producing a beef animal of quality, and at the same time hardiness. The qualities of the breed are so firmly fixed that they are invariably stamped on its progeny out of native or half-bred cows. In the half-bred progeny from black cows, the red marking of the sire sometimes gives place to black, but the white face is almost invariably present. Comparing the Hereford with its relatives, the Devon and Sussex, it is noticeable that it has more size than the one and more quality than the other. These variations have been brought about by a longer course of better feeding than the North Devon has received, and more careful selection for early maturing beef purposes for a longer period

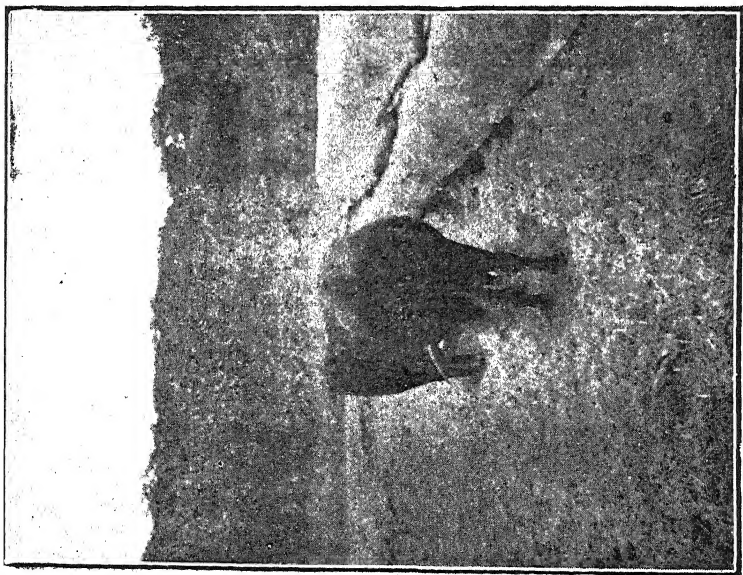
than the Sussex has experienced. One finds that the Hereford comes near the Shorthorn for size and is superior to that breed as regards quality of meat. It is also hardier than the Shorthorn, and more able to forage for its living, and would appear to be suited to our moderately good, but not to our poorest, land. Fashions alter in cattle, as in other things, and Herefords may be obtained which answer fairly well to the description, "dual purpose animal." Their great excellence, however, lies in their beef and grazing qualities, and where it has been sought to develop them into milch cattle, there can be little doubt that some hardiness has been sacrificed. The Hereford is being quite extensively used all over Southern Rhodesia as a ranching animal, and in most instances the results have been satisfactory. Unfortunately, in the past it has often happened that only very moderate Colonial-bred bulls have been obtainable, and where the second or third generation has been reached, a deficiency in size is noticeable. Better bulls than formerly are now obtainable in the south, and should correct this fault, but it is the writer's opinion that the Hereford, in common with all other European breeds, will need occasional infusions of Home-bred blood, in order to maintain its size and early-maturing qualities.

It may be noted that bulls with red hair round the eyes are preferred by some breeders, as they are likely to transmit this marking to their progeny, and animals with eyes thus marked are thought to be less liable to ophthalmic trouble.

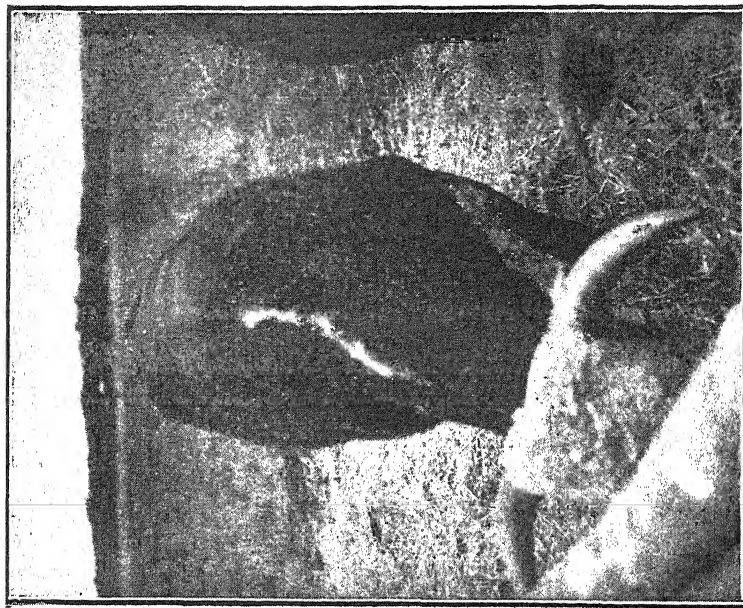
A small herd of four or five very excellent cows, and some bulls, the property of Mr. C. S. Jobling, of Devonby, near Bulawayo, is the only pure imported stud herd at present maintained in Rhodesia. There is, of course, a large number of imported bulls in the country.

THE NORTH DEVON BREED.

In considering the Devon breed, it is necessary to make oneself quite clear as to the different types of Devon which exist. Most people interested in cattle are familiar with the fact that there are North and South Devons, and that they differ materially in their chief characteristics. Mr. St. C. B. Gwynn has dealt with this subject in a very interesting article in the August, 1911, number of this *Journal*, to which I would refer those readers who may have access to it. The North Devon



The back and quarters of a typical Hereford Bull.



The back of a typical Hereford Bull.

has been bred primarily as a beef beast, but also with a view to producing as much milk as is consistent with very first-class beef-producing qualities. The South Devon, on the other hand, has by admixture of other blood, richer feeding, selection, and so on, been developed on dual purpose lines, but with milk production as the primary object. The North Devon is a comparatively small, compact animal, whereas the South Devon is one of the largest breeds in England. For the purpose of this article then, the South Devon may be left out of our calculation, and will be discussed at some future date under the heading of milk or dual-purpose breeds.

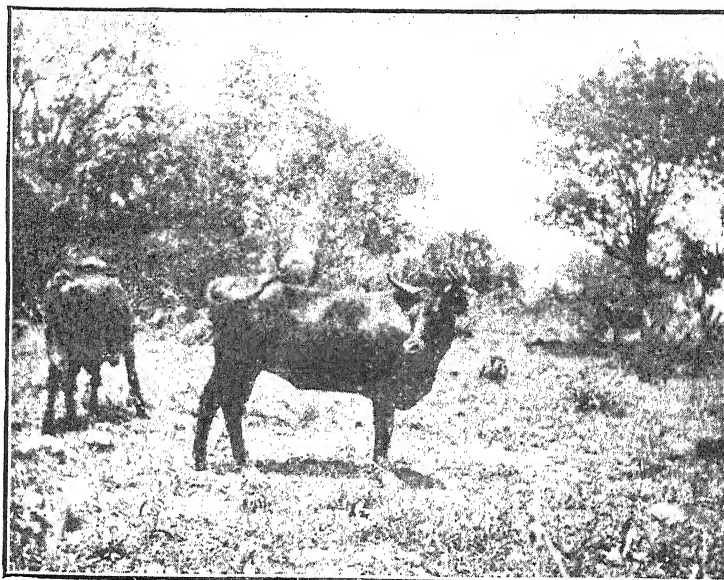
It will be remembered that we are at present considering the beef breeds, and amongst Devons the small North Devon is a type most clearly developed on those lines. It has been bred for generations amongst the hills of Dartmoor. It is of a size suited to very moderate pasture. The breed tends to fatten quickly, and produces beef of very great excellence. A type of the breed, equally pure bred, is found on the richer lands of Somerset and Cornwall, where, owing to better pasture and the greater desire on the part of farmers to develop the milking qualities, it has been increased in size, and is perhaps more nearly a dual-purpose animal than its smaller relative of the hills. These two types have again been bred together with a view to increasing the hardiness of the one and the size of the other; with the result that pure-bred herds of North Devons may be found which vary from the smaller hardy beef type up to dairy or dual-purpose animals of considerable size and milking powers. The North Devon is considered to have a common origin with the Hereford and Sussex, the latter of which the Somersetshire type closely resembles.

In colour, the breed is red, varying from light to rich warm colour (but quite distinct from the "plum colour" of the Sussex), with the exception of a little white on the under line behind the navel and white hairs in the brush of the tail.

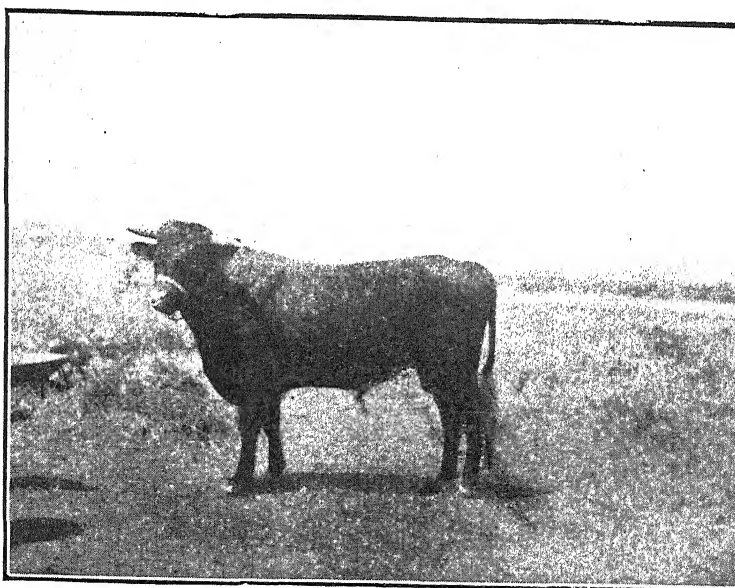
The Devons differ again from the Sussex in that the skin at the base of the horns, round the eyes, on the muzzle and in the ears is orange tinted. They have usually good curly coats, and in summer present a peculiarly attractive mottled appearance. The horns of the bull are thick, moderately short and usually curve outward and forward. Those of the cow are lighter and curve rather outward, forward and upward.

Let us consider the more strictly beef type only, for from the foregoing it is obvious that degrees of milking qualities can be obtained to suit individual requirements. In size they are smaller than the Sussex or Hereford, although the oxen are relatively large as compared with bulls or cows. They are noted for symmetry, early maturity, lightness of bone, quality of flesh and great hardiness. The cows give a fair quantity of rich milk. The breed is firmly fixed, and, provided care is taken to see that the bull used is really bred on the lines desired, he should not fail to stamp his qualities on his progeny by local cows. The reader will say, "These, then, are the very animals for Southern Rhodesia," and it may be that he is right, especially in reference to our poorer and more exposed soils. The chief objection to the Devon is its want of size, which by some is considered a drawback in bulls required for mating with diminutive cattle. The great size of the larger beef breeds is principally due to their environment during many generations, and to liberal and constant supplies of food. Deprived of this food and environment, their progeny must lose size to a greater or less extent. The question, therefore, for breeders is whether it is better to have an animal naturally suited in size to the grazing conditions and climate of the country or to have one which, degenerating in size to meet these conditions, may lose many of its better qualities. Before attempting to answer this question, the breeder must go very fully into the quality of his land, and the system of farming which he intends to pursue. The writer would point out that, in the case of either a small or a large breed, it is highly probable that occasional infusions of Home-bred blood will be required for many years to come, in order to maintain the normal qualities of the breed.

It may be pointed out that while the Devon is suited to an exposed and moderate pasture, few breeds of cattle respond more readily and profitably to artificial feeding. A limited number of very useful Devon animals are obtainable from the Cape Colony and the Free State, and we have one pure-bred herd in Rhodesia, the property of Mr. St. C. B. Gwynn, of Edwalini, Nyamandhlovu. Mr. Gwynn's bulls are of the right sort, and many of them, as well as the cows, are bred out of English imported stock. His cows are of various types, but amongst them some of the small North Devon are to be found.



Pure-bred North Devon Heifer, the property of Mr. St. C. B. Gwynn.



Imported Devon Bull, "Chorister," the property of Mr. H. Williams, Macheke
Small beef type.

It is interesting to learn from Messrs. Malevis Bros., butchers, of Bulawayo, that a three-year-old Devon ox, bred and fed by Mr. St. C. B. Gwynn, weighed 702 lbs., and that the beef was first class.

ABERDEEN ANGUS BREED.

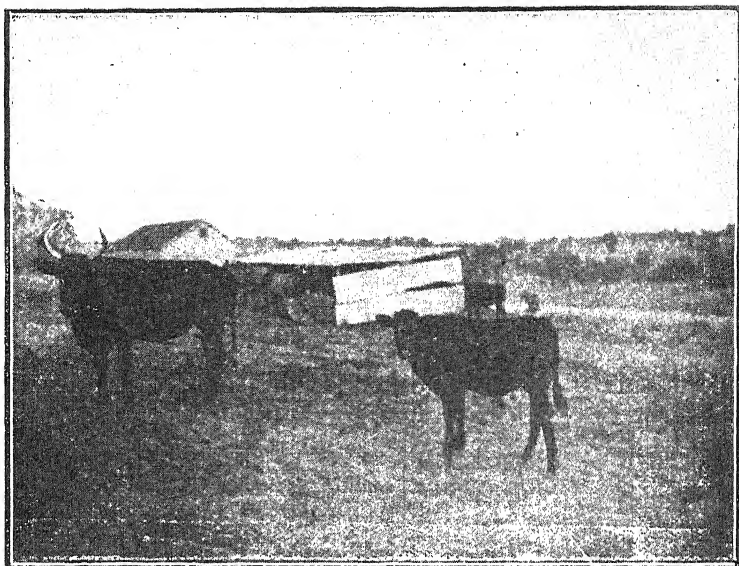
There is no necessity to go into the details of the history of the Aberdeen Angus breed of cattle to grasp the characteristics of the type, although the history of any good breed of cattle must always be interesting and instructive to cattle breeders. It is sufficient to say that the Aberdeen Angus has been carefully and systematically bred with the object of developing its present qualities for about the same time as were Shorthorns, and that the herd-book of the breed is the second oldest in existence. As beef-producing cattle under suitable conditions, they are probably the best in the world. Well-bred specimens of the breed should be wholly black, a little white in front of the udder of the cow, or scrotum of the bull, only being permissible. They should be completely polled; loose scurs or undeveloped horns denote probable impurity of breeding. In form they are as near the ideal beef beast as possible, and are remarkably heavy weighers. The flesh is of good quality, with a large proportion of lean meat in the right place.

Mr. Otto Zimmerman, of the Rhodesia Ranching Company, and Mr. A. W. Partridge, of the Lendy Estate, have probably more experience of the Aberdeen Angus as a rancher than anyone else in Southern Rhodesia. Mr. Zimmerman so far finds them very satisfactory, both as feeders and weighers, but he expresses a doubt as to whether they will weigh quite as well proportionately as four-year-olds as they do as young oxen, and he is rather in favour of the Shorthorn as a cross for our native cattle. He finds, however, that Aberdeen Angus crosses from East African cows are low, deep and stocky, whereas Mr. Partridge so far finds that his crosses of the breed from Victorian cows are inclined to be leggy as they mature. Probably, when these latter come to the block, as many will during the present year, they will be found to weigh out well. Messrs. Harvy and Anderson, near Umboe, in the Lomagundi district, and Mr. Dobbin, in the Umvukwe Hills, both have grade Aberdeen Angus cattle running on their ranches, and these appear to be doing well. Now, although

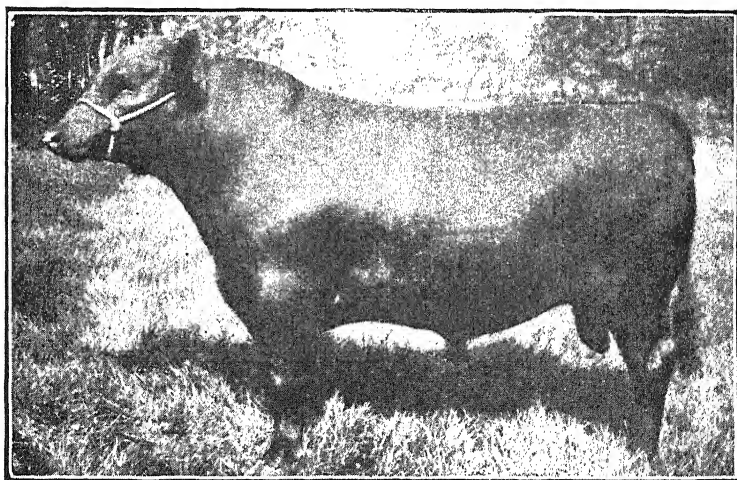
the Aberdeen Angus is a hardy animal, it has been developed on a liberal supply of good food, and has not, as a rule, been subjected for many generations to natural conditions in winter. From its history the writer would expect to find as time goes on that it is not altogether successful in Rhodesia, except on very exceptional veld. When, however, the time arrives when it shall be found possible and profitable to artificially feed and fatten cattle in winter, then it is very doubtful if any other breed will be found which will pay so handsomely for such treatment. Home-breeders of the Aberdeen Angus claim for them that they are good milkers, and that the quality of the milk is above the average. No doubt many herds and individual animals have been considerably developed as milkers, but for all practical purposes the Rhodesian farmer will do well to consider them as beef-producers. If dual purpose animals are required, there are other breeds that will answer to this description much better.

THE AFRICANDER.

The Africander is so well known to the average Rhodesian farmer that little space need be devoted to describing his general characteristics. As a purely beef and trek breed the Africander is in favour with many as first cross on our smaller native cattle, with the object of giving them size, before introducing one or other of the British breeds. Under certain circumstances, and especially where the original cows are small and weedy, and good native bulls are unobtainable, the above is probably a good plan. Again, where the farmer cannot see his way to adopt any measure of modern methods, the Africander is undoubtedly a good and useful beast. Under normal circumstances, and provided European bulls are obtainable, the writer personally holds the opinion that a European breed may safely be introduced on to the native type without first using the Africander, and, subsequently, should it be found advisable not to breed the cattle too fine, he would advocate using a bull of the same type as the original cows for a season, rather than introduce a third type in the form of the Africander. It is only within quite recent years that the Africander has been officially recognised as a distinct breed by the Free State Agricultural Judges' Association. As is the case with all



Half-bred Aberdeen-Angus Bull Calf, 14 weeks old, and Native Dam,
on the Lendy Estate.



Aberdeen-Angus Bull.

breeds, if the Africander is used at all, it is well to have a good animal which possesses in as great a degree as possible the more desirable qualities of the breed. With this end in view, it may be of interest to readers to give here the chief points of excellence required in the Africander by the Free State Judges' Association. They are as follows :—

<i>Bull.</i>		Points.
1. Head.—Strong, masculine, forehead broad, face comparatively long and lean, eyes large, full, expressive, indicative of good disposition, muzzle clean cut, nostrils large, horns long, low set, slightly elevated at tips; waxy in colour and amber-tipped.		10
2. Neck.—Thick, short, well-defined hump, throat full with loose flesh underneath, dewlap commencing abruptly, drooping and fairly loose	... ..	5
3. Forequarters.—Shoulder heavy, broad, well covered on blades and top, brisket deep and projecting prominently from between the forelegs, legs straight, short, especially under knee, arm full, shanks fine	... ..	15
4. Body.—Chest broad, deep and full at the back of the elbows, back straight, ribs well sprung, barrel well rounded and deep with large abdomen	... ..	30
5. Hindquarters.—Hips moderate in width but not prominent, rump broad, long and level (drooping rump not to disqualify), thighs medium thickness, broad and rounded, legs short, shank fine, flank deep and full, tail well set, thin and with good switch	... ..	18
6. Skin.—Soft, elastic and of medium thickness, hair fine and of blood-red colour	... ..	8
7. Hoofs.—Large, firm, pointed, toes not spreading, colour dark amber	... ..	4
8. General Appearance.—Form symmetrical and elegant, carriage bold but graceful, walk straight and free	... ..	10

Cow.

Practically the same as above, but with the following modifications, namely :—

Neck.—Fine, medium length, throat clean, dewlap well marked but not heavy.

Forequarters.—Fine and smooth, brisket moderately deep.

Body.—Same as for bull, and loin broad.

Udder.—Deep and full, evenly quartered, with medium-sized teats.

Colour.—Same as bull, but white on belly in front of udder not to disqualify.

Agricultural Shows.

Attention is directed to forthcoming agricultural shows which will take place at Gwelo on 21st and 22nd May; Bulawayo on 28th and 29th May; Umtali on 12th and 13th June; and Salisbury on 19th and 20th June. Attractive programmes are in course of preparation; and each show promises to contain features of especial interest.

Notes on Friesland Cattle

IMPORTED INTO LOMAGUNDI DISTRICT FROM CAPE COLONY.

By JAMES S. STRUTHERS, Palm Tree Farm, Lomagundi.

With the establishment of a creamery at Gwelo greater interest may be anticipated in a class of cattle that will meet the needs of the general farmer to a greater extent than has hitherto been the case, when ranching or beef-grade beasts have been most thought of.

The profit from the cow in ranching, other than as a breeder, does not enter into the consideration. So long as she produces a calf for trek or beef she serves her purpose, and a milking capacity beyond the needs of the calf is not required.

The usual 1,500 morgen farm is not, however, a ranching proposition; it is one of general farming as a rule, and the settler on such will be well advised if he endeavours to obtain a profit from his herd while breeding for increase. Such is the general practice in the more settled portions of South Africa, where the breeding herd is looked to to provide a regular monthly income from milk, or milk products in some form or another, usually through the creamery. A periodical profit is made by sales of stock to the butcher, or otherwise, as opportunity offers, which may be considered the rancher's profit.

It may be taken for granted that it will take several generations of breeding from native stock to raise a cow of a standard that will make her of any value as a milker, and this thought induced me in 1909 to import a truck load of Colonial Friesland heifers and a bull from the Cape.

I quite recognised that I was taking considerable risk, particularly as the animals were to be located in what was then a freshly-opened area, viz., beyond the Hunyani range of hills in the Lomagundi district.

My experience with this importation, and another made later in May, 1911, will I think be useful to new settlers or others who may wish to do likewise.

Of the first importation of 16 animals, two died within a week, and it is noteworthy that both were stall-reared calves. Another died six weeks after arrival, with sores on the legs resembling blood-poisoning. The remainder acclimatised thoroughly, and are now as much at home, and keep their condition as well, as any native cattle. My bull "Grafter" and cow "Shield," photos of which accompany these notes, are of this importation, and are now five years old. They have had no artificial feeding.

For the first year spraying was practised, to keep down the ticks, so that a gradual inoculation to tick-borne diseases was obtained. They came from the Queenstown district in Cape Colony, a mild redwater area.

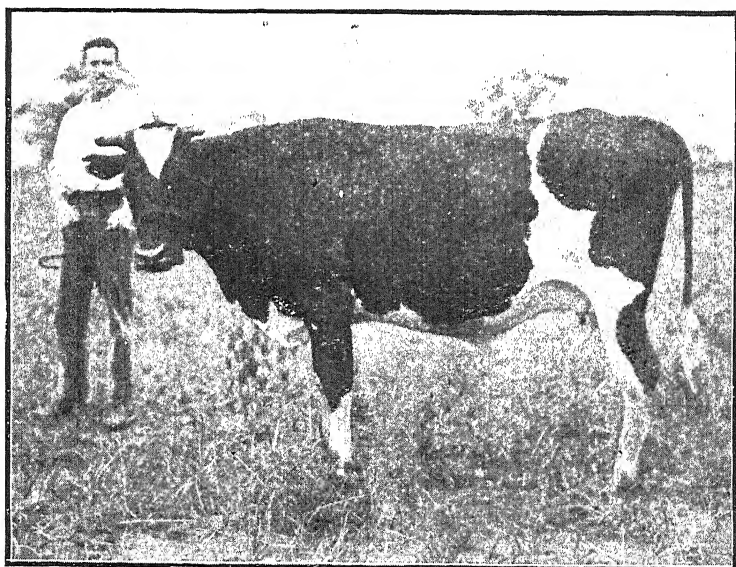
In April, 1911, I visited Cape Colony and obtained 32 heifers of the class I desired from the Karoo, absolutely non-redwater veld. One died *en route* from Gadzema to here, again a stall-fed calf, the only one of the batch.

Examination disclosed impaction of the stomach, due entirely, I should say, to over-gorging, and then being driven without an opportunity to ruminate. After this incident, I started travelling first thing in the morning, the cattle picking their feed at a halt at noon. After arrival here, I adopted the same spraying precautions as with the first importation. All the animals during the first three months had listless periods, but only two had to be specially cared for. The late Mr. Cameron, then Cattle Inspector, Sinoia, took blood smears from one of these, which indicated, according to reports from Veterinary Department, one of the stages of redwater.

The most important consideration, in my opinion, is that newly-imported cattle should be warmly kraaled for the first few months after arrival in Rhodesia, as the cold nights seem to tell on them at this time. I was fortunate in having a brick kraal, inside of which I could put these heifers for the night, and to this I attribute my good fortune in getting them all through a critical period so easily.



Friesland Bull, "Grafter," and his herd of cows.



Friesland Cow, "Shield," five years old. This cow, with her first calf, milked for 16 months, yielding over 1,000 gallons of milk, grazing only.

Mr. Pickering, my neighbour, took 15 of the 31, and had a somewhat similar experience to my own. I had 9 calves within eight months of their arrival here, none of the heifers at calving having more than two permanent incisor teeth, and some not that. With such young mothers, having gone through acclimatisation during pregnancy, some of the calves did not do so well. Two of them died from anaplasmosis. The remaining seven calves are now yearlings, and doing splendidly, as also are all the later calves. The calves from the five-year-old cows and the later ones from the now three-year-old heifers are, in my opinion, better developed at birth and grow out better than they would do with like treatment in most parts of Cape Colony.

With a little extra attention and care during the first year, I do not think settlers need fear taking the risk of importing good class veld-reared stock from the older colonies, and thus building up good herds of milk cows at once.

Review.

The South African Poultry Magazine and Kennel News.

We welcome and commend to our readers this practical poultry magazine, which has recently come into being in Johannesburg. Any publication calculated to bring home to the people of South Africa the exceptional opportunities that exist for poultry farming will perform a public service, and we trust the new magazine will to some extent have this effect. The magazine itself contains much information of a very useful nature, and will be found of much assistance to all interested in poultry.

Rhodesian Tobacco.

PROSPECTS OF AN AUSTRALIAN MARKET.

By ERIC A. NOBBS, Ph.D., B.Sc., Director of Agriculture.

Every outlet for our rapidly increasing production of tobacco demands attention whether it be small or considerable, prospective or immediate. To this end I carried with me to Australia samples of our unmanufactured leaf of different grades supplied by the Warehouse as characteristic of large quantities, also samples of pipe tobacco and cigarettes manufactured from Rhodesian leaf by the Tobacco Company of Rhodesia and South Africa, Ltd., of Bulawayo, and three coast firms. The object was to ascertain the prospects of a market in Australia, to introduce our tobacco to the notice of manufacturers and dealers and to learn their views thereon. The accompanying notes will convey the impression gained.

I called upon seventeen firms of manufacturers, tobacco importers, dealers and retailers, enquiring as to the prospects for Rhodesian tobacco, exhibiting my samples, calling attention to our products and discussing generally with them conditions of the trade.

I have brought together the opinions expressed to me in the following notes, and I may say that I found a very general agreement in the views expressed.

A number of the larger tobacco manufacturers are understood to be united in a trust, although this is denied by them. The so-called combine appears to be mostly concerned in cigarettes, and keenly interested to secure suitable leaf which it is having increasing difficulty each year to obtain. If this

alliance of big manufacturers can be induced to take our tobacco, which it seems is only a question of prices, and is not unlikely, it would want it in enormous quantities.

Other manufacturers are experiencing difficulty in getting bright cigarette cutters and are on the outlook for fresh sources of supply, but at present the difference in price is too great. These remarks refer only to our bright leaf; there is little prospect for the sale of our darker samples and heavier pipe grades of leaf.

Both the raw and manufactured tobacco are much admired on their merits and also as forming an attractive novelty. They agreed that to establish its popularity systematic and active advertising was required. All our manufactured lines elicited admiration on account of brightness, aroma and combustibility, in which they appear far to excel the generality. Competent judges refused to credit the absence of scents and flavouring essences, even when this was distinctly indicated on the labels, but were always struck by its characteristic flavour. The *Invicta* brand, manufactured by Messrs. Hermann and Canard, though but lately introduced, is already established on the market and was very favourably commented upon by the firms handling it, both wholesale and retail, and is likely to become quite popular when it is better known.

Importers and retailers were much interested in the different brands of cut tobacco I was able to shew them, and expressed a desire to communicate with the manufacturers, particulars regarding whom I supplied. The pipe tobacco which is most popular in Australia is that which sells by the million at 10d. or 1s., put up in 2 oz. tins. There is evidently a better prospect for the sale of our pipe tobacco than for our cigarettes or raw leaf and a large business is likely to grow up. The landed cost, including the duty of 2s. 6d., should be so fixed as to enable it to be retailed at 1s. per 2 oz. packet. Further, it was made evident that brands of cut tobacco must be packed hermetically, and that the labels of different strengths should be of different colours or tints to facilitate handling. If entire freedom from flavouring essences of all kinds can be guaranteed it is well to emphasise the fact on the labels. Manufacturers should send full ranges of their vari-

ous lines to their representatives in Australia and meet their peculiar requirements indicated above as far as possible, even supplying them, if desired, with an exclusive blend. It was suggested that to attract attention to our tobaccos specially low prices should be quoted for the first couple of consignments or for the first few months, so as to get these unknown brands on to the market, making it quite clear to the firms concerned that this is only a temporary measure.

Plug tobacco seems to be largely consumed in Australia, and enquiries for this type from Rhodesia were made. Certain peculiar standards as regards size and weight are insisted upon. The want of a light and bright plug is specially emphasised. It seems likely that there is an outlet for our medium and dark leaf in this direction. Plug tobacco enjoys the advantage of the preferential rate and requires a minimum of labelling and packing. Australian plug tobacco is highly flavoured with all sorts of ingredients to try to impart to the inferior leaf the aroma which ours naturally possesses.

As regards cigarettes, there is no preferential tariff, the rate on all importations being 6s. 6d. per lb. The chief demand in Australia is for cheap lines with a brilliant label outside and an attractive picture inside. There is, therefore, likely to be difficulty in introducing and establishing Rhodesian cigarettes whatever the quality may be. The opinion seemed to be that our cigarettes were not able to rank with the highest class of cigarettes de luxe, nor, on the other hand, to replace the popular favourites, especially at present prices, but that under certain circumstances a good business might be built up.

Rhodesian cigarettes to retail at 9d. or 1s. for 10 would have to be offered at low prices to the trade, and they would need to be got up in different and more ornate style—preferably in boxes. It seems unlikely that this can be economically done in Rhodesia, as packing materials, etc., have first to be imported. Even then the sale would not be large, as the great demand in Australia is for the cheap local article, familiar, well advertised, and attractively packed. The quality of our Rhodesian cigarettes was warmly approved, but quality seems to be a subordinate consideration in Australia.

The economic tendency of Australia is towards the importation of raw produce to be worked up by Australian labour for Australian consumption, especially as regards cigarettes and cigars, less so as regards our pipe tobacco and plug. Raw leaf as graded by the warehouse can, of course, only be sold to the manufacturers. These are limited in numbers and include some very large and a few small firms. Rhodesian bright leaf would compete in Australia as in South Africa with the Virginian type from the United States, and with locally-grown leaf. For our pipe qualities and our short medium bright leaf there is no prospect of a market at the Rhodesian price of 1912, 8d., 10d., and 1s. 2d. per pound. Small leaf with a large proportion of stalk entails too much expense in handling under Australian conditions of dear labour. Our heavier leaf resembles the best class of Australian grown air-cured tobacco, which of course has no protection of the tariff, and is therefore precluded from competition. Our bright leaf—cigarette cutters—which at the 1912 sale in Salisbury fetched from 2s. 9d. up to as high as 3s. 4d. is comparable to leaf from the United States, which was bought last year at 1s. per pound in Australia, and next year is likely to be dearer, perhaps 1s. 3d. or 1s. 4d. Tobacco of this class is in great demand, and, if prices suited, would find a ready sale amongst Australian manufacturers, but leaf which at our 1912 sale fetched 2s. to 3s. is at present bought in the United States for 10d. to 1s. As regards duties, America and Rhodesia are on precisely equal terms in Australia for this leaf. The price is constantly rising in the United States. It is recognised in Rhodesia that our prices must fall somewhat as supplies increase and the industry approaches normal commercial conditions. Ere long leaf of this type may therefore become saleable in Australia. Rival manufacturers agreed upon these points and did not regard business as out of the question by any means—indeed, they were enthusiastic as to the merits of our leaf. The difficulty in getting American leaf of the quality desired and similar to ours is increasing year by year, and is felt over the whole world. It would probably be best to treat Rhodesian bright leaf as an altogether new line and to introduce it as such, purely on its own merits, which are recognised, and on its own characteristic flavour and aroma. Turkish tobacco elicited

little interest and did not seem to be known or appreciated. A small quantity of this type is grown in Queensland. Curiously enough all the manufacturers assured me that there would be no market in Australia for our brands of our pipe tobacco and cigarettes made in South Africa, but the evidence and experience of importers and retailers is otherwise.

On my arrival in Australia I was faced with some difficulties regarding the duty levied on different classes of tobacco amongst the samples I took over. This raised the whole question of the preferential rates granted to South African tobacco, and on this subject I had several interviews with the Federal Minister for Trade and Customs, the Hon. Frank G. Tudor, and with Mr. Lockyer, the Comptroller General.

There appears to be some disparity in the terms used in the Customs Tariff (South African Preference) Act, 1906, and the Customs Tariff of 1911. As it was desirable to secure a clear ruling on the point it was arranged that I send certain samples to the Customs authorities and receive their decision as to classification. The samples referred were as follows:—Dark leaf suitable for pipe, medium bright short leaf, cigarette cutter bright leaf and Turkish leaf; also Connaught and Kingsdown cigarettes in packets and tins of cut pipe tobacco of Matabele mixture and Ambrosia brands.

As a result of these enquiries it appears that under the present interpretation of the tariff cigarettes do not enjoy the preferential rates. South African tobacco leaf pays 2s. 6d. on being imported with a preference of 1s.; and if manufactured would have to pay the excise of 1s. in addition. Such tobacco in bond enters Australia under Item 21 from any part of the world at 1s. 6d. in bond plus 1s. excise on manufacture. This is therefore no preferential advantage to South Africa, though at first sight it appears such. Did the one shilling preference actually apply to our unmanufactured leaf, the favourable verdict of the manufacturers on the subject of the quality of our leaf mentioned above indicates that we might expect to find a market for our bright cigarette tobacco in competition with America. As it stands at present the so-called preference to South African tobacco applies effectively only to cut pipe tobacco and to plug.

I venture to think these facts are worthy of attention in connection with any reconsideration of the Australian-South African preferential tariff which I gathered was under contemplation.

The quantity of tobacco grown in the whole of Australia is little, if any more than in Rhodesia. Although soil and conditions appear in many places favourable and in spite of a bounty of 2d. per lb. granted during the past five years, but now stopped, the production of this crop has in the past been checkered. Air-curing is largely practised in Australia. It would appear that one of the main causes of the comparative non-success of tobacco is the want of suitable skilled and unskilled labour. In Tasmania the early frosts have been found to render tobacco too precarious for it ever to be a success.

The Government in the Australian States have not done as much to assist tobacco growers as in Rhodesia. Queensland has a tobacco expert attached to the Department of Agriculture. A leaf expert employed by Messrs. Wills, Ltd., gives his services during certain seasons to the Government for purposes of advising tobacco growers in New South Wales.

Dry Season and Droughts in Rhodesia.

By the REV. E. GOETZ, S.J., Director of Bulawayo Observatory.

The importance of the dry season from an agricultural point of view is somewhat under-estimated in Rhodesia. The broad statement one generally hears that it rains during six months of the year, and that during the other six months it practically never rains, is very misleading. A study of the rainfall records shews that it is much safer to assume that, as often as not, no useful rain falls in the greater part of the country from the end of March to the end of October. The following table will bear out this statement :—

Rainfall for October and April.

	October.		April	
	S'bury	B'wayo	S'bury	B'wayo.
Years	17	16	17	16
Average	1.15	.98	1.00	.59
Highest	3.42	3.63	2.92	2.03
Years above 1 in. ...	8	6	6	4
Years below $\frac{1}{4}$ in. ...	2	7	4	7

The table clearly shews that it is imprudent to reckon on useful rains in these two months, especially in the west, where seven years out of 16 gave a rainfall of less than $\frac{1}{4}$ of an inch in these two months. A rain of this description is useless, on account of the rapid rate of evaporation from the soil, especially in October. But even rains of nearly an inch may be said to be useless at the beginning of the season, when they are, as is not rare, followed by a spell of dry weather.

What happened in Matabeleland this year is not likely to be forgotten. In many parts of the country, in most parts it might be said, there was no green grass at the beginning of February, and yet there had been a rainfall of $2\frac{1}{2}$ inches. This had fallen in two lots of over an inch at a time, but four weeks of dry, or nearly dry, weather which followed each of these rains rendered them absolutely useless. This year's experience is happily unique so far, but there have been seasons before in which the drought was also very severe. In 1905 there was no grass in Matabeleland in the middle of December. The rains had stopped in the middle of March, and the first rains of any use fell in the second week of December. Nor were the conditions much better in the east. In Salisbury there was no rain to speak of from the 6th of March to the 6th of November. Two good rains of .64 inch each, on the 6th and 10th of November, were followed by a month of nearly dry weather. In 1911 there were fair rains in the first week of October in certain parts of the country, but they were practically everywhere followed by six weeks of drought, during which, as in Victoria, Gwelo, etc., only a quarter of an inch fell. In other places, as in Bulawayo, Umtali, and Mount Darwin, these October rains failed, and the drought persisted right up to the middle of November, and even to the middle of December. Similar occurrences must have taken place in the nineties. In 1894 the Occupation Column found the cattle starving in the Gwelo district in November. The Hopefountain records give three-quarters of an inch of rain on the 3rd of October, and little or no rain after that date till the last week in November. In 1895 the same thing occurred again. At Hopefountain the first rains started on the 10th November. In Salisbury the October rain was less than half an inch, and the November rain less than two inches. Part of the records for 1896 are missing, owing to the rebellion, but the October rains, if there were any, were followed by a severe drought. In November there was only a fall of .85 inch on one day at Hopefountain before the 28th, when an inch fell. There had, however, that year, been a heavy fall in September. The following table gives a general idea of the dry season throughout Rhodesia. In compiling it, disconnected rains which fell at the beginning or end of each rainy season, and which in consequence were probably of no practical use from an agricultural point of view, have been considered as dry season rains :—

DRY SEASON IN SOUTHERN RHODESIA UP TO 1908.

Station	Umtali	Melsetter	Mt. Darwin	Marandellas	Chishawasha	Salisbury	Ayrshire	Victoria	Gwelo	Bulawayo	Hopetoun	Tshete (Sebungrwe)	Empangeni	Tuli
Number of seasons ..	7	8	5	6	6	10	5	6	7	10	13	4	7	8

Beginning of the Season. Mean date for the 14 stations, 30th March.

Mean date	April 3	April 14	Mar. 26	April 9	April 4	April 1	Mar. 28	Mar. 29	Mar. 24	Mar. 26	April 6	Mar. 21	Mar. 19	Mar. 18
Earliest on record	Feb. 21	Mar. 31	Feb. 23	Mar. 31	Mar. 19	Mar. 17	Mar. 17	Mar. 10	Mar. 8	Mar. 7	Mar. 9	Mar. 7	Mar. 5	Feb. 20
Latest on record	April 23	May 1	April 30	April 17	April 14	April 17	April 6	April 13	April 14	April 25	April 30	April 2	April 8	April 14

End of the Season. Mean date, 24th October.

Mean date	Oct. 18	Oct. 17	Oct. 27	Oct. 24	Oct. 20	Oct. 24	Oct. 17	Oct. 30	Oct. 27	Oct. 24	Oct. 26	Nov. 4	Oct. 23	Oct. 22
Earliest on record	Oct. 3	Oct. 7	Oct. 4	Oct. 4	Oct. 4	Oct. 6	Oct. 4	Oct. 11	Oct. 10	Oct. 5	Oct. 2	Oct. 25	Oct. 10	Oct. 4
Latest on record	Nov. 5	Nov. 5	Nov. 6	Nov. 17	Nov. 6	Nov. 9	Nov. 6	Dec. 12	Nov. 22	Dec. 3	Dec. 3	Nov. 17	Dec. 12	Dec. 17

Duration of the Season. Mean duration, 6 months 25 days.

Mean duration	6 15	6 3	7 2	6 15	6 10	6 22	6 20	7 0	7 4	6 23	6 20	7 14	7 9	7 2
Shortest season	5 6	5 6	6 2	6 1	6 2	6 7	6 4	6 11	5 19	6 7	5 3	6 23	6 17	5 13
Longest season	8 7	7 0	7 28	7 13	7 7	7 20	7 20	8 13	8 4	8 23	8 16	8 10	9 8	9 4
Rainfall, during the longest season	2 70	3 13	0 89	1 19	0 55	0 68	0 93	1 21	0 45	0 66	0 99	0 12	0 35	0 57

Season's Rainfall.

Mean amount	Inches 2 29	Inches 2 38	Inches 0 63	Inches 1 20	Inches 1 23	Inches 1 20	Inches 0 61	Inches 1 11	Inches 1 10	Inches 1 11	Inches 0 90	Inches 0 41	Inches 0 66	Inches 0 41
Highest	4 11	5 46	1 05	3 06	3 29	3 09	2 27	2 44	2 44	2 94	1 72	0 91	1 59	1 40
Lowest	0 04	0 86	0 04	0 52	0 55	0 22	0 20	0 33	0 06	0 27	0 20	0 12	0 03	..

Even a cursory glance at this table shews that the yearly drought is very severe in the whole of Rhodesia, except in a narrow strip along the south-east border. In any other part of the country one must be prepared to face occasionally a season of over seven, and up to nine, consecutive months during which the total rainfall may be only half an inch. This occurred in 1905, and has occurred again in 1912, practically everywhere. It has happened oftener in the parts of the country that are on the slope to the Limpopo or the Zambesi. If the last two dry seasons had been included in this table, the average duration of the dry season would be still greater. The dry season of 1912 lasted from eight to nine months, even if we consider that the rains started in December, which was by no means the case, as the December and January rains were in nearly the whole of Matabeleland and in some parts of Mashonaland, of little or no use to the farmer.

In the following table the date of the end of the rains at some centres has been given, with the duration of the drought up to December (for Tuli up to February, 1913):—

Dry Season 1912.

	End of rainy season 1911-12.	Duration of dry season.		Rainfall. Inches.
		Mos.	Days.	
Umtali	March 12	8	18	2.18
Marandellas	April 12	7	18	0.46
Salisbury	March 18	8	13	2.91
Mount Darwin	March 1	9	0	0.39
Hartley	March 18	8	13	0.60
Victoria	April 11	7	20	1.34
Gwelo	April 10	7	20	0.66
Bulawayo	March 10	8	21	1.22
Empandeni	March 1	9	0	1.40
Sebungwe	April 10	7	20	0.15
Tuli	March 1	11	0	1.97

The evident conclusion to be drawn from the study of these figures is that the dry season is every year an obnoxious factor in our climate, and only too often a disastrous one. They shew clearly that the general practice of Rhodesian stock farmers of trusting year after year to chance, and allowing their cattle to get what food they can find in the veld during the dry season, is sure to lead some time or other to disaster. To my knowledge cattle have on four occasions during the last nine years been seriously injured by the prolonged dry season in the Bulalima-Mangwe district, to quote one of the best cattle

districts of Rhodesia. This year, losses are counted by hundreds of heads on many farms. Some years ago, on the same farms, losses of 50 or more head were mentioned, and on two other occasions the owners of stock were exceedingly anxious at the end of the season, as many animals were kept alive with the greatest difficulty. This year's experience shews that to go on farming on the old lines is to court disaster; that two things are absolutely necessary for profitable stock farming. The cattle must be provided with winter food and with clean water, for the proportion of losses on farms where clean water was procurable in abundance for the cattle was notably smaller (even when no other food than the dry veld grass could be procured) than on farms where the cattle had to be watered from the muddy pools that existed in a few of the rivers of the west.

The effect of the dry season on cattle can be gauged to a certain extent by the monthly importation of dairy produce into Southern Rhodesia. The following table gives the value of the milk and butter imported month by month during the last two years :—

Value of the Imports of Butter and Milk into Southern Rhodesia.

		1911	1912	1913
January	...	£2,850	£2,447	£3,318
February	...	1,986	2,359	
March	...	1,835	2,082	
April	...	1,584	2,138	
May	...	1,406	2,838	
June	...	4,260	3,495	
July	...	2,596	3,365	
August	...	4,081	4,113	
September	...	2,610	4,871	
October	...	2,635	4,317	
November	...	4,659	4,132	
December	...	2,867	4,633	

In both years the reduction in the imports of dairy produce due to the rainy season affected four months only, and the beneficial effect of the rains seemed to last only for a short time after the end of the rains, whilst the effect of the drought was felt during eight months. The average importation in 1911 and 1912 during the four months—February to June and January to May—was valued at £1,703 and £2,256 respectively. If we assume this to represent the normal amount which we had to import on account of shortage of the local supply, or the lack of means of communication or some other

such cause, the difference may safely be said to be due in the other months, either directly or indirectly, to the yearly drought.

The severe drought which has affected the whole of Rhodesia last year, and some parts of it for the last two years, has led to many inquiries about the occurrence of such droughts in the past. Some years ago, whilst preparing a book on the rainfall of Rhodesia, published since by the Rhodesia Scientific Association, I collected all the information I could find on the subject, especially from the old residents in the country and from old natives. The conclusion I came to was that there seems to have been no general drought affecting the whole of Rhodesia since 1862. Nor could I get anything definite from the natives I consulted previous to that date. Since then, the last year's experience seems to have stimulated the native mind, and several reports both from east and west shew that the natives remember a severe drought some 40 or 50 years ago. In some parts of Matabeleland they mention also another drought of five years' duration, and from what they say that must have been from 60 to 70 years ago. I feel inclined to believe that both these are correct, and that they refer to the year 1862, and to a period of drought that lasted from 1844 to 1849. These droughts are mentioned, the first by John Moffat, the next by Livingstone. Moffat came from Kuruman to the Bembesi in 1862, and found a general famine all over the regions which he traversed, as well as in Matabeleland. The drought of 1844-49 in Bechuanaland, mentioned by Livingstone, extended right from Griqualand to the Limpopo, and was felt also in German South-West Africa, in parts due west of Rhodesia, from 1844 to 1848. As natives in Matabeleland speak of a five years' drought some sixty or seventy years ago, it is very likely that the one mentioned by Livingstone extended over a large part of Rhodesia also. It was a particularly severe one. Livingstone told Baldwin, the minister whom he met some years after on the Zambesi, that in one year of that period it practically never rained. In 1883-84 there was a very severe drought in the south-west. The late Mr. Carnegie, in his book, "Among the Matabele," mentions the late rains of 1883, but he told me that although crops failed in many districts, there was no general famine; the drought did not affect Mashonaland, as Selous and Montagu Kerr, who travelled through Mashonaland during the following dry season, do not mention any famine in the land. But the famine

was very severe in the south-west, in Tati, the Marico, and in Khama's country. In Tati hardly any rain fell before March. Curiously enough, very heavy rains fell after that right up to June. The heaviest rain on record for the last 30 years seems to have fallen on the 24th of May, 1884. Selous mentions it on the Gwaai. The Reverend Mr. Helm had three days of heavy rain at Zeerust on his way up to Matabeleland, and had to off-load his wagons in June to get through the mud in Bulawayo. At Tati, the rain was so heavy, according to Mr. C. Van Rooyen's recollections, that in an hour's time the Tati, Shashi, and Macloutsie Rivers were in places hundreds of yards broad. Two other severe droughts are mentioned in Bechuanaland in Moffat's life; one in 1834 and one from 1821 to 1826. In one of these years they had only one shower in twelve months. As this year also the drought was felt from the Orange River right up to the Zambesi, it is possible that these droughts affected Rhodesia also. We must, therefore, expect that there will be occasionally years of very serious shortage in the rains, and it is well to be prepared for such occurrences.

The losses incurred through a year of drought are probably greater than those incurred through any other natural cause. Complete statistics are not yet available, but from those we have we can fairly judge already. Apart from the losses in cattle, the following returns, published by the Customs Department, are very instructive, as for instance:—

Importation of Maize, Kaffir Corn (Grain and Meal), and Potatoes.

(Value at the place of origin).

1911.	1912.	Loss.
£14,440.	£104,079.	£89,639.

Exports of Maize or Kaffir Corn.

£25,161.	£12,893.	£12,268.
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Imports of Eggs, Butter, Milk.

1908.	1912.	Loss.
£34,357.	£57,041.	£22,684.

It is to be hoped that we may not in the near future have to cope with another such season, or that if we have we may be better prepared for it.

The Bean Stem Maggot.

By RUPERT W. JACK, F.E.S., Government Entomologist.

The insect to which the above name is applied is a native of Africa, and appears to be generally distributed south of the Zambesi, having proved injurious in as widely separated centres as Capetown and Salisbury. This is, however, as far as the writer is aware, the first occasion on which notes have been published on its habits and the injuries caused by its attacks. This is no doubt due to the fact that the crops which are subject to injury from it are not widely grown in South Africa, and therefore the pest when observed has been deemed of minor importance. In Southern Rhodesia, however, where great efforts are being made towards the discovery of crops to be grown in rotation on the poorer soils, any insect that militates to a serious extent against the success of such crops assumes an importance quite out of proportion to the monetary loss inflicted on the farming community at the present time. The following notes on the bean stem maggot, which, from observations made during the past two seasons, appears to be the most serious drawback to the successful cultivation of cow-peas, and certain other kinds of beans in the Territory, have been prepared as a contribution to a knowledge of this family (*Agromyzidæ*), the habits of which have not been greatly studied.

The scientific name of the fly has not yet been published, but from specimens bred from bean stems at Rosebank, near Capetown, Prof. Coquillett, of the United States Department of Agriculture, published a description in manuscript under the name of *Agromyza fabalis*. This description it is hoped will shortly be published in the annals of the South African Museum.

ADULT FLY.—The fly is a very small and inconspicuous insect, its total length from the head to the base of the abdomen scarcely exceeding one and a half millimetres or about one-seventeenth of an inch. The colour is a shiny blue-black, with the exception of the eyes, which are dull red. The body is provided with a considerable number of bristles of varying length. Greatly enlarged figures of the fly may be seen by reference to Plate I., figs. 1 and 2. The female fly is provided with a horny exsertile ovipositor, a drawing of which is shewn at Plate II., fig. 1. The distal end of this instrument is provided with a number of teeth like a blacksmith's rasp, and is undoubtedly used for the purpose of rasping a hole in the leaf. The exserted ovipositor is spoonshaped, and presumably the egg is received into the hollow of the spoon before being thrust into the tissues of the leaf. An egg puncture in the leaf under the microscope shews a pocket at the side in which the egg is situated, and, from what can be seen of the act of oviposition, the female thrusts about at the side of the hole with the ovipositor to form a cavity, and then apparently deposits the egg inside. Only one egg is deposited at each puncture, but the curious thing is that the female seems to make a very great number of incisions without depositing an egg at all. The following counts of punctures in leaves were made, and the number of eggs noted. This was done within a few days of the enclosure of flies with clean cowpeas, and just two days after the first oviposition had been observed, so the eggs had not had time to hatch :

- (1) Of 85 punctures, 4 contained an egg.
- (2) Of 22 punctures, 1 contained an egg.
- (3) Of 46 punctures, 6 contained an egg.
- (4) Of 41 punctures, 1 contained an egg.

The object of this apparently purposeless expenditure of energy is hard to understand.

The flies are more or less abundant throughout the wet season. They live about the host plants; in fact, so close do they remain to the food supply of the young, that two flies were to be seen at any time during several days about a potted cowpea plant on a stoep, and would probably have remained longer had they not been captured. How much they feed in nature is not known, but they possess a well-developed, fleshy

tongue, and will lick up sugar if given an opportunity. Oviposition commences within three days of the emergence of the flies, and a feed is not necessary in the interval.

EGGS.—The eggs are smooth, white, glistening objects, a long oval in shape, slightly tapering to one end, at which there is a minute projection. For their size, their skin is rather tough. They are, of course, exceedingly minute, and need a strong lens to bring them within the scope of our eyesight. The length is .35 to .37 of a millimetre, and the breadth about .15 of a millimetre. In other words, it would take over seventy of the eggs placed end to end to measure one inch. The shape of the egg is shewn at Plate I., fig. 9.

LARVÆ.—The maggots are whitish, with the exception of the mouthparts and the projecting spiracles, *i.e.*, the openings of the breathing tubes. Two maggots about full grown are illustrated at Plate I., figs. 5 and 6, the one from the side and the other from above. As may be seen, the edges of most of the segments of the body are thickened to act as false feet, and assist the passage of the maggot through the tissues of the plant. The two projections above the head are the anterior openings of the breathing tubes or trachea, the posterior openings being seen at the other end of the body. Each spiracle is connected directly with the corresponding spiracle at the other end of the body by a main tracheal trunk, from which branches are given off at intervals. These branches ramify again and again, so that the air is carried to all parts of the body. The spiracles are shewn at high magnification at Plate I., figs. 7a and 7b. The mouthparts, like those of all allied larvæ, are more or less vestigial, and have degenerated into rasping hooks. They are shewn enlarged at Plate I., fig. 8. In front of the mouthparts (see figure) is a single lobe, which may exercise the function of a feeler. The length of a full-grown maggot is about 2.7 millimetres, or a little over one-tenth of an inch. The whole life of the maggot is spent within the tissues of the plant.

PUPÆ.—The form of the puparium may be seen by reference to the figures reproduced at Plate I., figs. 3 and 4. The spiracles of the larva still project from either end of the puparium, and the mouthparts can be seen within. The colour is light brown, and the length 2.25 millimetres, or just over

one-eleventh of an inch. Pupation takes place within the tissues of the plant, although, owing to the decay of the part infested, the puparia are often exposed.

HABITS AND LIFE HISTORY.—Under cage conditions, the whole cycle of the insect has been passed in 36 days, of which 20 were taken up by the egg and larva and 16 by the pupa. The exact duration of the egg stage has not yet been observed.

The diagram on Plate III. gives a good idea of the breeding and feeding habits. The egg punctures are scattered over the parenchyma of the leaves, though usually more abundant towards the base. In a young plant the newly-hatched maggot makes its way beneath the epidermis, down the petiole of the leaf, and down the branch and stem, until it reaches a point just above, at or below the ground level, where it eventually changes to a pupa. The course from the leaf downwards is usually remarkably direct, but sometimes slight deviations are made. The stem of a cowpea is grooved when young, and these sunken grooves seem the favourite path, the exposed ridges being avoided or occasionally crossed over by a short route. Occasionally indications of paths may be seen in the pith, but it is difficult to be certain of their exact nature, and undoubtedly the bulk of the maggots pass downwards just beneath the epidermis. It may be mentioned here that, although a considerable number of plants have been artificially infested by means of caged flies, no attempt at oviposition has been observed anywhere except on the leaves. When the plants are older, the maggots do not penetrate as far as the base of the stem, but remain in the smaller branches, where the tissues are softer.

Although the point has not been definitely proved, it is likely that the insects pass the winter as puparia in the dry tissue of the plants, and mainly in the upper branches where the later broods feed.

INJURY TO THE PLANTS.—At the base of the stem where the maggots congregate in the young plants one of two things may happen. Decay may set in, and the plant die suddenly. Twenty to thirty per cent. and more of the young plants of certain varieties of cowpeas have been seen to die off in this way. Stronger or less heavily infested plants survive the

injury, and the wounds heal, the result being the formation of a swelling at the base of the stem. Even then the growth of the plant is frequently practically stopped, and the plant fails altogether to fulfil the object for which it was planted. Other plants make fair growth, but it is of a stunted nature, the plant being bushy and the internodes short. Late in the year the larger plants often die off above a point in the stem where the maggots have congregated, and frequently through the work of the maggots in the stem at the base of the petioles the older leaves fall off to a noticeable extent. The above remarks refer chiefly to cowpeas and beans grown as crops. French beans grown in gardens which are used in the green state do not suffer so badly, chiefly, it is believed, on account of their luxuriant growth. The young plants are, however, sometimes killed, and still more frequently stunted.

During the past season the infestation of the experimental crops of cowpeas at the Experiment Station, Salisbury, has been complete, and the more extensive plots at Gwebi Experiment Farm are stated by Mr. R. L. Thompson, Assistant Entomologist, to be similarly affected. At the end of the 1911-12 season, the writer was travelling round the Marandellas district, and on every farm where cowpeas or kafir beans had been planted, all the plants shewed the results of wholesale infestation. At one farm near Salisbury fourteen acres of haricot beans had been completely ruined, and reports of the destruction of lesser acreages were received, the specimens submitted shewing the presence of the stem maggot. The insect must, therefore, be considered a very serious pest. Heavy infestation may destroy the whole crop, and lighter ones may materially reduce it.

PLANTS ATTACKED.—Plants of the genera *Vigna* and *Phaseolus* seem to be the hosts of this insect. *Vigna* includes cowpeas and kafir beans and *Phaseolus* the scarlet runner and French beans, including the kidney and haricot beans. Soya and velvet beans are not attacked at all. *Vigna* and *Phaseolus* have a considerable number of wild representatives common on our veld, and without doubt these formed the natural hosts of the stem maggot before the introduction of cultivated varieties from overseas. It is the presence of these native hosts that renders the task of controlling this pest a very difficult one under present conditions.

RESISTANT VARIETIES.—There is one hopeful fact in connection with this pest, and that is, that certain varieties of cowpeas appear to be much more resistant than others to attack. As already stated, the infestation of the experimental plots of cowpeas at Salisbury this year was to all intents and purposes complete. Not a plant could be found of which the upper leaves were not stippled with egg punctures. The different varieties, however, suffered very differently. The "Iron" plot lost most young plants, a very poor stand being the result. "Black Eyed Susan" was very badly damaged. "Whip Poor Will" and an unnamed variety secured a fair stand, but many plants died. "Natal Black" and "New Era" both secured good stands, and thrived far better than the others. It must be mentioned, however, that in previous years the "Iron" cowpea has thrived better than any other. This may have been in the absence of severe infestation with stem maggot. To shew that the position of the plots had nothing to do with the above results, the order of the plants from east to west was: "New Era," "Black Eyed Susan," "Whip Poor Will," an unnamed variety, "Natal Black," and "Iron," which in degree of resistance to attack reads 1, 5, 3, 4, 2, 6. Kafir beans were noticeably more resistant than most imported cowpeas, although young plants frequently die from attack.

NATURAL CHECKS.—A species of Braconid wasp, shewn at Plate II., fig. 2, has been bred freely from the maggot, especially late in the season, but it appears to be altogether ineffective as a check. This parasite lays its eggs in the maggot by means of the sharp piercing ovipositor with which it is provided. The grub when hatched lives on the tissues of its host, entirely destroying it, and changes to a pupa inside the puparium of the fly. Only one grub develops in each maggot. The length of the adult parasite, exclusive of the ovipositor, is about 1.5 millimetres, or rather less than one-sixteenth of an inch, and the width across the expanded wings is about 4.7 millimetres, or about three-sixteenths of an inch. This is the only natural check discovered at present.

Allied Species also Attacking Cowpeas.—It is interesting to note that the maggots of a closely allied species of the same family mine in the leaves of cowpea plants, forming white irregular lines on the leaf, which increase in width as the maggot grows. This species cannot be considered a pest, and

is only mentioned as a matter of interest, as it is curious that plants may occasionally be found infested with the maggots of very similar and closely related flies, those of the one mining the leaves and doing little damage, and those of the other infesting the stem and vitally injuring the plant.

Possibility of Control.—The natural question of any one who may have read this article thus far will be, "How is one to avoid or remedy attack by this pest?" In this connection the particular value of cowpeas as a crop must, however, be borne in mind. The cowpea is grown as a secondary rotation crop for the purpose of renewing the nitrogen content of the soil, and is not sufficiently valuable in itself to carry the expense of treatment. On this account, remedies such as the application of poisoned bait for the adult flies, as has been proved effective against the fruit fly, and spraying with nicotine washes, a treatment that has lately been found of value in combatting the chrysanthemum leaf-miner in the United States, lie outside the pale of consideration in connection with cowpeas.

Manuring the ground freely has considerable value when growing French beans in garden plots, or for human consumption under field conditions, as it induces a vigorous growth and consequent resistance to injury by stem maggot. It is, however, obviously out of the question with a field crop such as cowpeas, grown mainly for the purpose of renewing the fertility of the soil.

Were cultivated species of *Vigna* and *Phaseolus* the only hosts, or even the main hosts of the stem maggot, the ordinary methods of utilising the crop, which entail the removal of the stems, or its conversion into hay or ensilage, would destroy the pest in the stems of the plants, and prove an effective check. Against the efficacy of this we have two facts, namely, that complete infestation of crops may occur the first time they are planted on new farms, and, secondly, that the planting of the crop a hundred yards or more from the nearest natural veld offers no visible protection from the pest. The latter fact proves that the adult fly can travel over a comparatively long distance in search of its host plant, and demonstrates clearly that the burning of a strip of veld round the land to destroy the pest in its natural hosts during the dry season has no practical value, since the strip would need to be disproportionately wide.

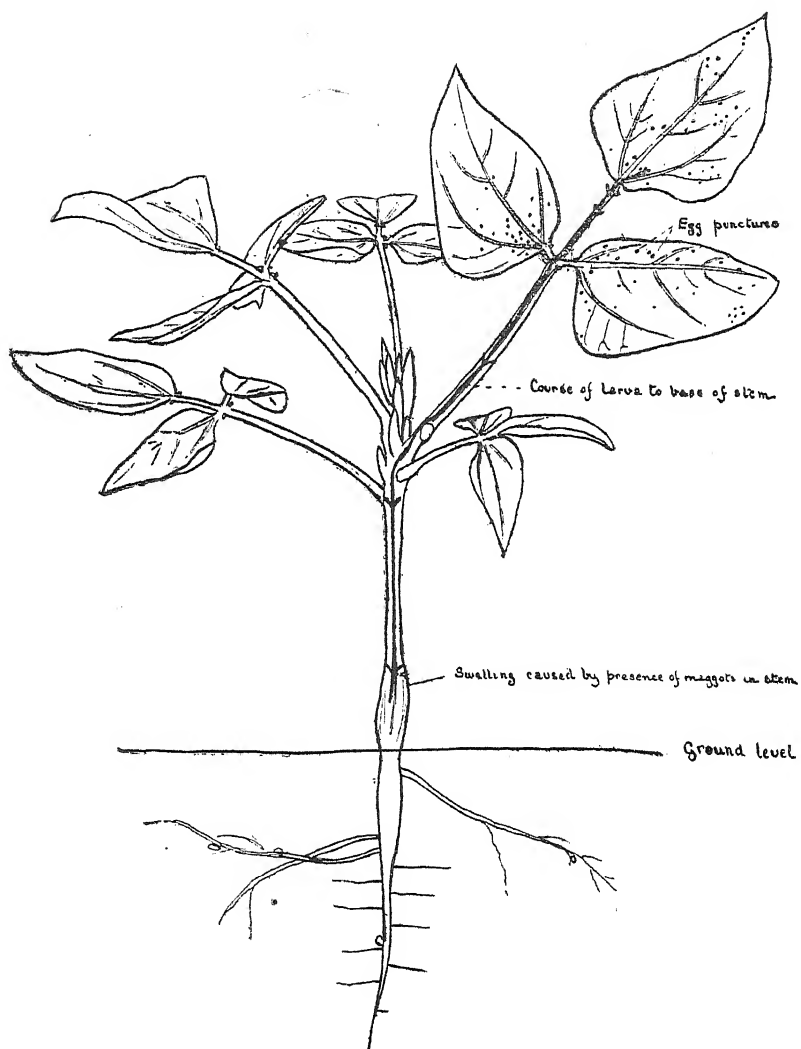
In many cases it is possible that a trap crop of a few rows of cowpeas sown with the first rains along the edge of the land intended for the main crop, and ploughed under after about three weeks' growth, would serve to reduce the initial infestation of the main crop, and this measure is certainly worth a trial, as it involves but little trouble and expense. It is likely to be of most value in the case of beans grown for human consumption, but there is no reason why it should not be applied to the less valuable crop of cowpeas. It should attract the early appearing flies to lay their eggs, and if well covered by the plough the maggots should perish, or if they pupate and flies emerge, they would be unable to reach the surface.

Let it not be supposed, in spite of present difficulties, that there is reason to despair of the possibilities of cowpeas as a crop in this country on account of the ravages of this fly. We know that certain varieties have shewn considerable resistance to attack, and that the kafir bean is an acclimatised variety of cowpea markedly resistant to the insect. The problem has therefore a botanical side, namely, the discovery or manufacture of varieties which will grow and yield a good crop, in spite of infestation with this pest, and there is no reason to believe that this is impossible or even improbable. In spite of the general distribution of the pest, good yields have in certain cases been obtained.

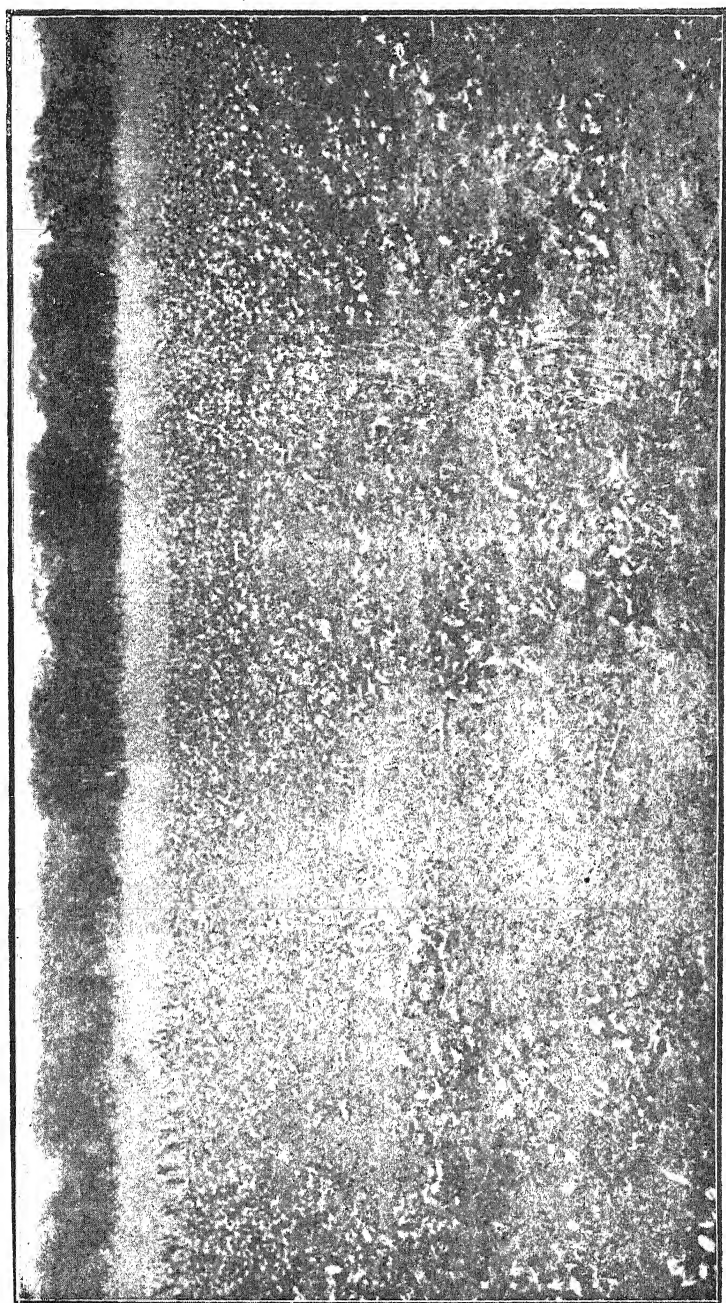
AGROMYZA FABALIS.

Explanation of Plates.

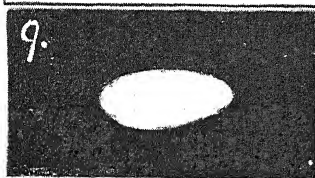
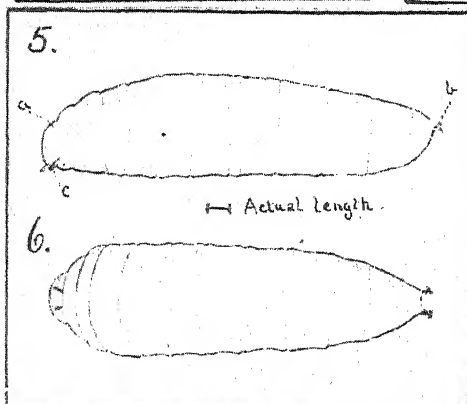
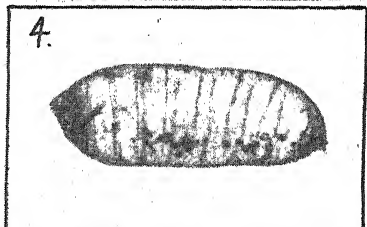
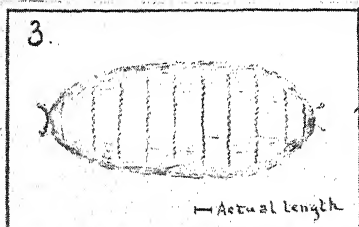
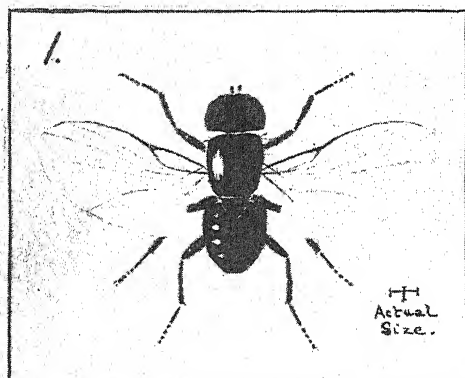
- Plate I., Fig. 1.—Adult fly—greatly enlarged. Dorsal aspect.
 „ 2.—Adult fly—greatly enlarged. Lateral aspect.
 „ 3.—Puparium—greatly enlarged. Dorsal aspect.
 „ 4.—Puparium—greatly enlarged. Lateral aspect.
 „ 5.—Larva—greatly enlarged. Lateral aspect :
 (a) anterior spiracle ;
 (b) posterior spiracle ;
 (c) mouthparts.
 „ 6.—Larva—greatly enlarged. Dorsal aspect.
 „ 7.—Spiracles of larva—enormously enlarged.
 7a. Anterior spiracle.
 7b. Posterior spiracle.
 „ 8.—Mouthparts of larva greatly enlarged.
 „ 9.—Egg—very greatly enlarged.



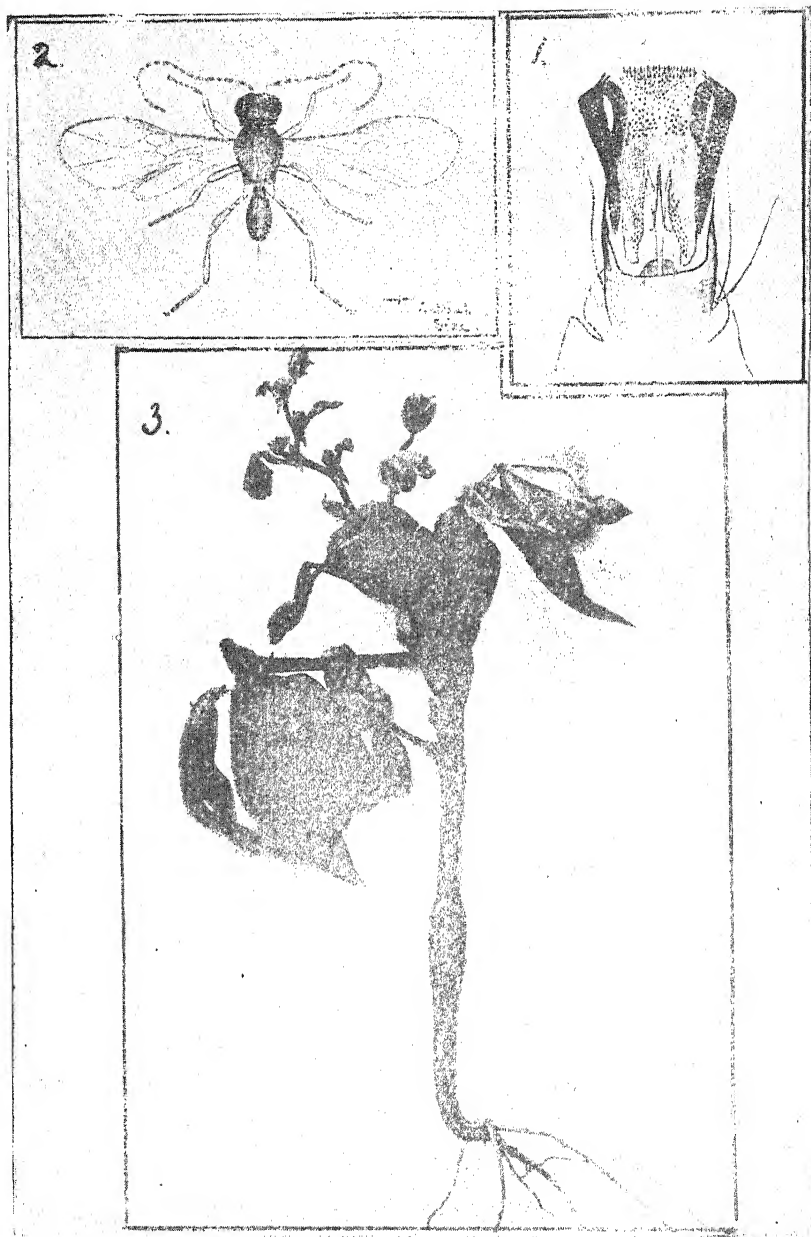
Bean Stem Maggot.—PLATE III.



Bean Stem Maggot.—PLATE IV.



Bean Stem Maggot.—PLATE I.



Bean Stem Maggot.—PLATE II.

- Plate II., Fig. 1.—Ovipositor of female—enormously enlarged.
,, 2.—Female Braconid parasite of bean stem maggot.
,, 3.—Cowpea plant injured and stunted by bean stem maggot.

Plate III.—Diagram of young cowpea plant infested with bean stem maggot, shewing egg punctures in leaves, course of a maggot under epidermis to base of stem, and swelling caused in stem at the congregating point of the maggots.

Plate IV.—Plots of cowpeas suffering from stem maggot attack. The variety in the foreground is "Black Eyed Susan," and the gaps are practically all due to young plants having died out from the attack of the maggot. On 13th March, when the photograph was taken, many plants were dying or dead, and all the plants were suffering. Beyond may be seen the unbroken row of the next plot of the "New Era" variety, which shews very few gaps from the pest, and the plants have made a fair growth.

Hints to Intending Irrigationists.

ERECTION OF PUMPING PLANTS.

By S. McINTOSH, Director of Irrigation and Reclamation,
South Australia.

There is nothing so disheartening to the amateur irrigator who has to provide his private water supply than to realise, after due consultation with theoretical experts and a very considerable expenditure in labour and hard cash, that his venture results ultimately in comparative failure through causes which might have been avoided had he first secured and followed the advice of anyone experienced in successful, practical, and economical irrigation. In the past thousands of pounds have been foolishly squandered by beginners in the purchase of unsuitable machinery, attempts to irrigate with short or bad water supplies, the selection of unnatural irrigation sites, and in various other ways. Surely we should benefit from such examples instead of blindly repeating them. Nevertheless, the average beginner figures out that he knows all there is to learn in the business, and in nine cases out of ten finally decides that a little practical guidance would have saved him much worry, labour, time, and cash.

OBJECT IN ERECTING A PLANT.—The sole object of the practical man is to provide the means of supplying the difference in quantity between the mean annual rainfall in his own particular district and the actual quantity of water necessary to produce the maximum yields of production per acre. Roughly speaking, the total amount of moisture required to secure this result, with careful cultivation and judicious application of the

artificial supply on an average soil, is estimated at about 30in. Assuming 12in. to be the annual precipitation, this leaves a balance of 18in. to make up, to which should be added another 4in. (a low estimate on large areas) for evaporation and seepage losses when the water is delivered through open flumes and channels. The proposed plant must, therefore, be capable of supplying a total of 22 acre-inches, or approximately 500,000 gallons per acre per annum distributed over the seven or eight months known as the irrigating period.

QUALITY AND QUANTITY OF WATER AVAILABLE.—The first consideration is the quality of the water, *i.e.*, its suitability for assisting in the successful growth of economic plant life. This is rather a difficult problem to settle, as so much depends upon the nature and amount of the alkali contained in the water, and also the general character of the soil to which it is applied; but it is a generally accepted rule that the water should not contain more than 70 grains of carbonates (other than calcium) and chlorides per gallon, although in Egypt a mineral content of over 200 grains per gallon is recorded as having been used. We have no table shewing either the various proportion of salts or the result derived from the use of such water as compared with the lower percentage. Wherever the water contains over 50 grains of injurious or excess alkali to the gallon the greatest care should be exercised in the selection of the land intended to be irrigated. In the first place it must not contain more than one-fifth of 1 per cent. of chloride of sodium or common salt, the generally accepted axiom being that any soil containing more than one-fourth of 1 per cent. of the enemy renders it unfit for most culture plants; secondly, it must possess a thorough drainage.

A successful irrigation plot should possess a good sandy loam from 9in. to from 4ft. to 5ft. in depth over a fairly retentive marl and clay subsoil, and with a slow but perfect drainage. Pure sand or gravel for any great depth, limestone rubble on the surface and to a depth of several feet, close and heavy clay or closed in flats of a clayey nature without any natural drainage or get-away for the excess water, which is sure to accumulate earlier or later if such soil is irrigated, are to be carefully avoided if it is desired to run the venture at a profit.

SELECTION OF PLANT.—The water and soil proving satisfactory, we now arrive at the selection of the plant itself. This is naturally guided by either the quantity of water or land available. With areas of an acre or less in extent, provided the site is exposed and prevailing winds may be depended upon to supply the necessary driving power, a strong modern windmill and pump, both of approved design, with a storage reservoir to hold from a thousand gallons of water upwards, should meet all requirements. If the irrigator possesses that now fairly common adjunct to farm economy, viz., a portable oil engine or motor, with the addition of a small centrifugal pump, a safe auxiliary is provided in maintaining the necessary water supply in the event of a long continuous spell of calm or hot weather. Wherever practicable use an up-to-date centrifugal pump. For areas of from an acre up to 100 acres an improved oil engine or motor (paying due regard to economy in consumption of fuel) is recommended. From 100 acres onward, where the firewood supply is plentiful, cheap and permanent, the good old reliable steam plant can safely be depended upon to give satisfaction; but where the natural fuel supply is at all doubtful the latest type of gas producer plant takes and will maintain first place until such time as it is displaced by a new and more economic power. In the selection of a pumping plant of any considerable capacity the opinion of a competent and practical engineer should be first secured and followed.

Since these notes were commenced the bulletin issued by the University of Arizona Agricultural Experiment Station dealing with "Pumping Plants for Irrigators" has been brought under my notice, and as it fully endorses and supports my views and experiences I quote from it as follows:—

PUMPS.—The advantages of the centrifugal pump for the individual irrigator are so conspicuous, and its adoption so general, that the discussion will be confined to that type.

Pumps are usually purchased wholly on the reputation of the makers and without regard to details of construction. Both open and closed runners give high efficiencies if well designed and built. Much depends on whether the channels and blades are finished or left rough. Machining these surfaces adds materially to the cost, but greatly reduces the friction and eddying of the water. In the best pumps the impeller, if enclosed, is cast in two pieces, and all the surfaces of impeller and casing are machined and polished. Many pumps have only the runner machined. There are also many makes of pumps which are left entirely rough. These last are of

very poor construction, very inefficient, and should not be purchased. The bearings of the pump shaft, or at least the outboard bearing, should be self-oiling and of the ring-oiling type, end thrust should be compensated, and the packing gland should be of approved construction.

Where electric power is available, pump and motor should be direct connected on the same bed plate. Such a plant requires the very minimum of attention, and should give a combined efficiency exceeding 48 per cent. Such a unit can be set deep in a well pit, just above the water level.

If the water table fluctuates greatly between wet and dry seasons a horizontal pump must either be set so high that the suction is apt to be too great or else it runs a risk of being submerged. A vertical pump can be run submerged, and is especially adapted to cases in which the water table rises and falls greatly, or to cases where the water level drops to the limit of suction when pumping begins. It is advisable to keep the suction lift less than 12ft. If this cannot be done with a horizontal pump, then a submerged vertical pump should be installed.

Centrifugal pumps are exceedingly sensitive to change of speed, and in each installation the most efficient speed should be determined and then maintained. A revolution counter should be purchased with every pump. The cost is only 6s. 3d. Overspeeding may be justifiable sometimes, but never should the speed fall below the best speed.

Deep well pumps should be used in drive wells if the water level is at a considerable depth and the well is driven from the surface of the ground. Pumping by air lift is entirely feasible, though of low efficiency. A greater draught may be made upon a poor well by an air lift than by any other method; but the cost of pumping is high, and air lifts are not recommended where the lift exceeds 80ft.

POWER.—The choice here is very wide. Gasoline and steam engines occupy the field at present. Suction gas producers, hot air engines, and internal combustion engines using crude oil give promise of coming into use. Suction gas producers, especially, are well adapted to Arizona conditions, and will furnish cheaper power than any other type of plant except water power. They are only available for plants larger than 15 horsepower.

Large irrigating plants should have a competent engineer. The small irrigator is usually not a mechanic, and besides he is a very busy man. He needs an engine which will work with a minimum of attendance and repairs. A breakdown in the dry season may mean ruin. Small differences in efficiency are often outweighed by other considerations. The greatest care should therefore be taken to select an installation which will give the least possible trouble afterwards.

The symmetry of a pumping plant deserves far more consideration than it usually receives, especially in the case of gasoline plants, where the fuel bill is the principal item in the cost of pumping. If the engine is too light the speed of the pump is too low; if the engine is too large its own efficiency is greatly reduced. *Both engine and pump should work up to full rated capacity, or nearly so.*

The symmetrical design of a pumping plant is not a simple matter, and usually additional advice to that of the selling agent should be obtained. One unfortunate irrigator was recently observed to have around his well two boilers, two engines, and three pumps. He stated further that he had sent for a fourth pump and thought he might have to change engines again. By this "cut and try" process a satisfactory plant may ultimately be obtained, but the process itself is ruinous.

The attendant of a gasoline engine should learn how to adjust his engine so that the ignition will be timed properly, and the explosion as strong as possible. The spark should pass a little before the piston is at the end of its stroke—in the case of a high-speed engine, about five-eighths of an inch.

PIPING AND CONNECTIONS.—There are many seemingly unimportant details which are under a purchaser's control and which, if neglected, cause great leakages of power and increase in cost of pumping or decrease in amount of water pumped. It has been our observation and experience that the worst features of recently installed plants have been in these minor details, and the consumption of fuel has been found doubled in many cases from this cause.

The pulleys ordinarily found on centrifugal pumps are so small that with the irrigator's usually loose belt the loss by slipping is very great. Larger pulleys for both pump and engine should be specified in the original order. Idler pulleys should be avoided, and friction clutches are unnecessary.

The belting best adapted to this country has been found to be a six-ply canvas stitched belt of the Gandy make. It is a perfect outdoor belt, while a leather belt rapidly goes to pieces if allowed to get wet, and a rubber belt does not stand a hot and dry climate. The Gandy belt may be estimated at about eight cents per foot per horsepower, assuming that it is run at an economical speed. A belt connection should not be less than 16ft. centre to centre of pulleys.

The foot valve with strainer, usually unsuspected, is undoubtedly a great offender. The strainer rarely has sufficient waterway. It should be of very ample and generous size, and the foot valve should be abandoned. Either a check valve placed immediately above the discharge opening of the pump, or, even better, a flap valve which can be lowered over the outlet of the discharge pipe, should be used. In either case the pump can be quickly primed by means of a pitcher-pump attached to the pump casing or by a steam siphon. The siphon, or ejector, is recommended for all plants operated by steam power.

The suction and discharge pipes should be materially larger than the pump openings. Doubling the diameter of a pipe reduces the internal friction loss to about one thirty-second of its value, assuming the discharge to remain unchanged, and reduces the energy head of the escaping stream to one-sixteenth of its value. The advantage, therefore, of large size piping is readily apparent. The following sizes of piping are recommended for the more common makes of centrifugal pumps:—

Diam. of Pump Opening. Inches.	Diam. Suction and Discharge Pipes. Inches.	Diam. of Pump Opening. Inches.	Diam. Suction and Discharge Pipes. Inches.
3	..... 5	6	..... 10
4	..... 6	8	..... 12
5	..... 8	10	..... 15

Where two suction pipes are used, the diameter of each should be that of the pump opening. The discharge pipe should be connected through a tapered increaser about 4ft. in length, and the suction pipe should be connected through a reducing elbow or a straight increaser.

The pump should be placed so low that the suction lift is as small as possible, or it may run submerged in the case of vertical centrifugal pumps. When the pump and pipe joints are well packed there is no advantage in the lower lift except for the easier priming, but when a gland packing becomes worn the efficiency of the pump is lowered by a high suction head. Suction of more than 20ft. is difficult to maintain with any pump, but more especially with centrifugals. The suction pipe, however, should be considerably longer than 20ft. to prevent air from being sucked down the side of the pipe.

If elbows are necessary, they should be of the "long sweep" type. Steam fittings have usually been employed, but a column of water does not change direction with the same ease as steam. The cost of the long sweep fittings is no more than that of standard steam fittings.

For low lifts it is not necessary to purchase standard pipe for discharge pipe, as riveted galvanised pipe does equally well and is cheaper.

TESTING THE PLANT.—Finally there should be installed near the outlet a weir box for measuring the water pumped. The lift from the water level in the well (while running) to the top of the outlet should be measured in feet. The useful horsepower accomplished can then be computed in the following manner:—Discharge in cubic feet per second multiplied by lift in feet and divided by 8.8 gives the useful horsepower.

An operator usually knows the approximate brakepower of his engine, and if the useful power is not from 50 per cent. to 60 per cent. of the rated brake horsepower, he should seek out the reason why, and make the needed improvements. It is assumed that the engine is running up to its full capacity at the time when the test is made.

Suggestions and Precautions to be Remembered.

1. If you seriously contemplate going in for irrigation, thoroughly discuss the subject with and accept the advice of a successful agricultural and horticultural irrigationist or engineer with some local experience.

2. Rigidly close your ears to purely theoretical irrigationists who would attempt to persuade you that irrigation under any conditions must prove an unqualified success.

3. Should you be so situated that you cannot secure the desired information in the matter, be guided as follows:—

(1) Be sure the quality of the water is suitable and the supply sufficient for your anticipated requirements.

(2) Satisfy yourself as to the suitability of the cultivation site for economical irrigation.

(3) Secure a written guarantee and insist upon a practical test from the firm supplying the plant, so that in the event of its not meeting your specified requirements you incur no expense or loss.

(4) Remember the watchwords of the irrigator are—efficiency, economy, and simplicity, or translated into every-day language, an efficient supply of fresh water applied to suitable soil with the greatest degree of economy through the medium of the simplest machinery.

(5) Erect your plant as near the actual water supply as is consistent with safety and economy.

(6) Be sure your foundations are solid and permanent.

(7) If engine power is required, erect a suitable and as nearly as possible sand-proof shed over the whole plant at once. Do not wait until it has been partly ruined by exposure to the elements.

(8) Remember the maximum suction in practical work is from 20ft. to 24ft.; consequently keep your pump as close to the water level as is practicable.

(9) Suction pipes should be straight if possible, and the lower end should not be less than 2ft. below the lowest water surface level.

(10) Do not vary the diameter of your suction pipes, *i.e.*, follow the table and maintain the one size suitable to your plant.

(11) Suction pipes must be kept rigidly free of all air leaks; if you wish to maintain an efficient water supply; the flame of a lighted candle, if held near the leaking joint, will disclose the smallest leak.

(12) If a valve is necessary, make sure its area is sufficient and equal to the diameter of the suction pipe. Use either a head valve, in which case an air ejector is necessary to create the necessary vacuum in the pump chamber and the suction pipes, or a foot valve placed in the pipes as close to the bed of the pump as is convenient, where it can be examined without the necessity of hauling up the full length of suction, or the employment of a diver in the event of it going wrong.

(13) Discard the usual *strainer*. If one is necessary, construct it out of galvanised wire or bars, with at least four times the cubic capacity of the original.

(14) Use both suction and delivery pipes in accordance with the table. Do not let the machinery agent coerce you into accepting anything less.

(15) Do not use pipes with a rough inside face.

(16) Never use a short right angle bend. Insist upon long bends or sweeps wherever they are necessary.

(17) Do not pump your water higher than the point at which the bulk of it is actually required. If the lift and area warrant it, provide oftakes and stopcocks at the various levels.

(18) Keep your flumes and channels clean and in good repair.

(19) Maintain an adequate supply of fuel, oil, etc., commensurate with all reasonable requirements. Do not leave it so that you have to procure them in the middle of a heat wave, when your crops require prompt attention.

(20) So arrange everything that you can run the plant and irrigate at night during excessively hot weather.

(21) Promptly dismiss the lazy or careless attendant if you desire a constant and efficient water supply.

(22) Keep all glands well packed, bearings properly lubricated with the best brand of lubricant, and the plant maintained in good order generally.

(23) Supply your crops with a drink at the right time, *i.e.*, when they require it. Do not wait until they are languishing or dead before you commence irrigating.

(24) The successful irrigator must of necessity be a thinker, a close and careful observer, and must follow common sense practices throughout.

Farms and Farming in Rhodesia.

CHARTER-ENKELDOORN DISTRICT.

By J. A. T. WALTERS, B.A., Assistant Agriculturist.

The district visited comprises the country to the south and south-east of Umvuma as far as Felixburg, and extending north as far as the Ngesi River and Fort Charter. It includes practically all the occupied farms between the Central Estates on the west and the great native reserves on the east. The two centres of the district are Enkeldoorn and Umvuma, the latter of which is the terminus of the railway from Gwelo, and consequently the distributing centre for most of the district, and for Victoria and Chibi to the south. Practically all this region consists of granite and other sand soils, and is generally regarded as poor for agricultural purposes, although on account of the abundance of water and the earliness of veld grasses it is considered excellent for stock. The soil, however, although generally classed as sandy, differs very considerably in character in the various parts of the district, and even on the same farm. These differences in the soil are clearly reflected in the character of the flora, so that the farmers not unfrequently plough up land for agricultural purposes on these botanical indications alone. There are five distinct varieties of sandy soil in this district easily distinguishable from one another. The first, a white, sandy soil, very fine-grained, always wearing badly when traversed by roadways, is considered by the farmers to be the poorest soil of all. It occurs frequently in the district, and is characterised in its winter flora by the presence of low-growing creeping shrubs. The next is a pinkish sandy soil, coarser in grain than the above, probably derived from granite, and characterised by the presence of proteas (sugar bush), which

abound in it. It is considered to be good tobacco soil. Another is a dark, sandy soil, characterised by its flora, which invariably contains acacias in numbers. This is considered to be extremely fertile soil, and bears cropping to maize for many years without manure. This class of soil occurs on the sides or tops of bults, and is in no wise alluvial in character. The sub-soil, when I had opportunities of examining it, consisted of a light red soil. A hard black sand, characterised by its good wearing qualities when roadways were cut through it, is very extensively represented in the district, and is sometimes termed "brack" soil by the farmers. It would seem in general to be fertile, although in places brackish spots occurred which were quite barren. There are two kinds of vleis, one the ordinary vlei soil found in the bottoms of valleys, moist almost all the year round and alluvial in character; the other moist formations on sloping ground, sometimes extending to the valley bottom, but frequently only reaching half-way down, indicating an outcrop of porous rock between two impermeable ones. This latter variety is therefore not a vlei soil strictly speaking, although continually referred to as such. It is of the greatest value to the farmer, on account of the early grazing it affords. In some cases, when ploughed up, it yielded a good crop of winter wheat without irrigation, as at Jackalsbank.

In addition to the sandy soils described above, a red soil derived from diorite or banded ironstone formations occurred on certain farms, notably on Sterkstroom, Mooigelegen, Glen Connor, Veeplaats, Luck and Swartfontein; and on Sterkstroom and Veeplaats there was also an extensive formation of black alluvial soil.

The district in general is flat, with gentle undulations. The only hills of any considerable height are the Maneesi and Mashaba ranges on the west and north-west. The country generally is high and open, with no dense bush. Water courses are numerous, and tributaries to the bigger rivers, the Ngesi, Umniati, Sebakwe and Sabi, traverse the district east and west.

It is evident from the foregoing description of the soils that the district is primarily a stock country, being well supplied with water and being extremely healthy for most classes of animals. The altitude is considerable, and the country is comparatively open, and frost occurs right up to September.

Horses do well, and several farmers go in for breeding on a small scale. Horse-sickness is not unknown, but even unsalted animals seem to do well on most of the farms.

Donkeys are bred at Kaalplaats. Cattle invariably do well, and although the class of stock is not high, they thrive exceedingly. Very few losses have been experienced through the exceptionally trying spring of 1912-13, although most of the cattle were in poor condition. The farmers have never been in the habit of providing winter feeding of any kind, but most of them are determined that losses due to poverty shall not occur again. Sheep have been introduced, but opinions are divided as to the suitability of the district for this purpose. Persians and crosses with Persians do fairly well in small flocks, but merinos have so far been a failure. One farmer introduced close upon a thousand pure merinos into the district last year, and his losses up to December, 1912, were over 150, exclusive of a total loss of lambs. Pigs thrive well, and almost all the farmers have a few. Some of the farmers cure their own bacon. Several farmers pay attention to poultry rearing, and at Veeplaats over 400 head are kept, and at Rocky Spruit Mr. Butterworth markets an average of about 600 eggs a month. Goats are fairly general in the district, and occasionally turkeys and geese are kept.

Maize is the principal crop grown in the district, and the variety used is exclusively Hickory King. On the richer soils, the farmers are going to give Salisbury White a trial. The whole crop of maize, however, is very small, and so scarce was the supply towards the end of last year that prices then ranged from 25s. to 30s. per bag. Kraal manure has to be applied every two or three years on the sandy soils.

Wheat is hardly less important than maize, and is grown principally under irrigation as a winter crop. Attempts have been made to grow it as a dry land winter crop and with success by Mr. Krienke, of Jackalsbank. The variety grown is almost exclusively Els Wheat—a poor yielder, and with nothing much to recommend it. Mr. Hoffman, at Pennyfeather, grows Holstrea Wheat—a superior variety in every respect—and Mr. Haman, at Mooifontein, grows Wol Koren. The biggest grower of wheat is Mr. Van Royan, at Sterkstroom, who produces from 200 to 250 bags each season.

Oats are a great favourite, and Cape oats and Algerian are the varieties grown. As a rule, only enough for use on the farm is produced, as the distance from any market makes any sale difficult.

Rapoko is one of the best paying crops, according to the few farmers who grow it. Mr. Kok, at Glen Connor, has 100 acres to this crop.

Kaffir beans (Nyamba) are regarded as a very paying crop, and at Glen Connor there are 30 acres, and 30 acres again at Maneesi Poort. Like rapoko, beans find a ready sale among the natives and on the mines.

Plots of onions averaging about half an acre were grown on many of the farms, but the farmers complain that market conditions make it unprofitable to grow larger quantities. The variety grown is almost exclusively Natal Yellow, which is valued for its good keeping qualities.

The experimental lots of paspalum distributed to farmers have been a great success on the damp portions of the farms. At Inhoek, a plot growing on a vlei had spread with great rapidity, and was getting the better of the reeds. A similar result was observed at Fairfield. Some of the farmers mean to put down a large acreage to this grass. A careful examination was made of the early native pasture grasses growing on vleis and damp situations, which constitute the bulk of the spring feeding in this district.

Boer manna is grown in small quantities on several farms. Teff grass will be tried by many of the farmers this coming season. Mangels were grown at Reubenvale, sown broadcast in March, 1912, and, thanks to the irrigation available, produced a good crop, which has been a great stand-by to the owner. Lucerne was attempted in several cases, with a view to rearing ostriches, particularly at Wildebeestlaagte, but the unsuitability of the sub-soil prevented the crop from lasting more than a few years. Potatoes are grown where irrigation is available, but only in small quantities. Tobacco has been tried and found promising, but the scarcity of native labour deters farmers from undertaking this on a large scale. Bamboos of three varieties are being extensively grown at Driefontein by the Jesuit Fathers. Velvet beans gave a good return at Colonel

Taggart's farm Induna, as also did soy beans (variety unknown), where 12 lbs. sown gave a return of 485 lbs. Pumpkins are universally grown, generally broadcasted with the maize crop. Buckwheat has been successful at Induna.

Citrus fruit trees do fairly well throughout where they have been tried, except in the low-lying valleys, where the frost is too severe. The trees at Fairfield were laden with fruit, and at some of the farms the trees were 10 to 15 years old. The best lot was one of lemons, at Inhoek. Peaches, plums and apricots do well throughout. Apples, pears and cherries also do well at Veeplaats, particularly cherries, of which three varieties were grown. Grape vines do exceedingly well in the district, and were among the finest thus far seen in the country. Bananas suffer from the winter frosts, and pawpaws have been tried, without success, for this reason.

No serious attempt has yet been made to grow crops on a large scale, or to practise any system of rotation. A start had been made at Induna; and at Luck, Mooigelegen, Veeplaats, and Fairfield the owners mean to give serious attention to this side of agricultural activity this coming season. The scarcity of food this spring has brought home to the farmers the necessity for crop raising for the successful rearing of stock, and they are determined to benefit by the lesson. A number of the farmers seem to have done little or nothing in the way of improvements, although in occupation for many years. Irrigation is practised widely, and almost every farm has a dam. Mr. Beattie and Mr. Hallam are combining to construct a very big dam on their farms Wyldegrove and Lovedale. Mr. Lategan, at Veeplaats, has just finished arrangements for the erection of a pumping plant, and a very large irrigation scheme is in course of construction on Mooigelegen. There are 80 acres under irrigation at Mr. Gilfillan's farm Palgrave. Fencing is practically unknown, although the farmers are not unaware of its value in providing camps for their cattle and obviating the need of herd boys. The late Mr. Stewart Meikle's farms at Charter are fenced, and a good deal of fencing is to be erected at Fairfield and one or two other farms. The number of cattle in the Enkeldoorn district is approximately 18,000, sheep 5,500 and pigs 500.

Notes on Bee-Keeping.

BY FREDERICK SWORDER.

Old boxes, barrels and small packing cases served their purpose as hives for years, but in these now out of date receptacles bees could not be assisted, and even when the straw skep, on account of its warmth, was introduced as an improvement, it was still found that matters were not much improved, for even then the bees were compelled to build their own combs, and these were none too straight or parallel, thus sacrificing both time and honey. Then followed the invention of the frame hive, which has come to stay, and although the principle of it was a great step forward, yet something was still wanting to overcome waste of honey. Observant and thrifty bee-keepers of an inventive turn of mind then studied the design and construction of a naturally-built honeycomb, with the result that after repeated failures a means was accomplished whereby the commencement of cells was impressed on plain sheets of wax by passing these through engraved rollers of the required pattern. On fixing these sheets into frames and inserting them in the hive, it was found that they were a success, being readily accepted by the bees. This product is termed comb foundation, for in this form it is the starting point of honey comb. By persistent perseverance these wax sheets were perfected, and now manufacturers of comb foundation are producing it by the hundred-weight, selling it to bee-keepers as a commercial necessity. Several kinds of foundation are now manufactured to suit the requirements of bee-keepers; among them are: Brood foundation—a term implying that worker bees only are reared in it (from 27 to 29 cells occupy a square inch). Drone foundation—that in which males only are reared (from 16 to 18 cells go to the square inch). Super foundation—this product is used by the bees for storing

honey above the brood chamber. This kind is fitted into the 1 lb. sections, and, being made very thin, the unpleasantness of a very heavy mid-rib when eaten is avoided.

About thirty sheets of super foundation weight 1 lb., and when each sheet is cut into three squares to fit the sections, there are enough to fill 90 sections.

All three kinds of foundation are used by bees for storing honey. Eight sheets of brood foundation weight 1 lb. This is a sufficient quantity for a corresponding number of frames, allowing a whole sheet for each frame. When these sheets of brood foundation are fixed into frames and placed in a hive of bees, the impression of these cell walls will be extended or drawn out by them, and the queen will deposit a female egg in each separate cell. These will develop into worker bees or sterile females in twenty-one days. Some authorities maintain that part of a sheet of brood foundation only 2 inches in depth is quite sufficient, but, from experience, I find that it is false economy to fix it into a frame in this manner, for where this is done it is often found that the bees in extending the remaining part downwards to the bottom bar of the frame will construct it of drone cells, wherein the queen will deposit male eggs which develop into drones, thus a superabundance of these non-workers, yet honey-consumers, are raised when not wanted. On one side of each sheet of brood foundation there are over 3,000 worker impressions or cell bases, with a corresponding number on the other side, thus the eight sheets will contain at least 48,000 hexagonal impressions, and, given a moderate honey flow in the spring season, these sheets will be drawn out by the bees, or formed into perfect combs, in less than a week. When a swarm of bees is placed into a frame hive completely furnished, the temperature of the cluster may rise as high as 90 degrees Fahr., and while the sheets of foundation are in the warmest position, the wax is in a more pliable condition, and will be given the first attention. When a sufficient number of cells are considered by the queen to be deep enough, she will commence her work of laying on the centre comb, depositing eggs so long as she is fed by her attendants with the proper kind of food. In a short time the circle of eggs on several of the centre combs will be gradually enlarged until each cell is filled in all the combs on both sides. Regard-

ing the supply of comb foundation, it was not long ere the manufacturers realised that the demand for it was increasing yearly, while the bee-keeper was soon convinced that by its use much valuable time and honey was saved. The result of this demand was that unscrupulous dealers began to adulterate beeswax, and much of this inferior article was used in the manufacture of comb foundation. Although this was accepted by the bees, time told its tale, by reason of the low melting point of the spurious article, and the completed comb with its living contents, although wired, broke down in a shapeless mass, smothering the bees in the hive. The melting point of pure beeswax is 146 degrees Fahr.

Since it has been proved by practical experience, more especially in warm climates, that combs built of adulterated wax are unsuitable, manufacturers now use every care to ensure that all kinds of foundation are made of the best wax obtainable, while every reliance may be placed on its suitability by the bee-keeper. I have often heard it stated by some people that they consider that their bees must be doing well, for they have watched them bringing home wax in great quantities on their hind legs. Now, this substance which these observers witnessed being brought home is not wax, but pollen, and when it has been explained to them how wax is really produced, they exclaim, "How wonderful!" and depart thinking. It may be as well to state here that wax is a secretion, produced within the body of the bees through having fed themselves from their stores of honey, and by clinging to one another in festoons a compact living mass of them is formed. There they hang for several hours, retaining and increasing the temperature of the cluster, when upon the eight plates or pockets under the abdomen, clear scales of wax appear. Only in worker bees are these wax secreting membranes present. On one of the joints of the hind legs there is an arrangement resembling a set of jaws. This upper one is supplied with a number of teeth which close on the flattened surface of the lower one. These jaws, which are found in the worker bee only, are used for removing the pellets of wax from the abdomen, whence it is transferred to the mouth for mastication and conversion into cells. In studying nature, it was found that the combs built by bees were spaced about $1\frac{1}{2}$ inches apart from centre to centre, but even then in practice a difficulty

presented itself, for a larger proportion of drone comb was present in a frame hive than was necessary, and it needed some contrivance whereby this $1\frac{1}{2}$ inch spacing could be reduced to $1\frac{1}{4}$ inch, in order to restrict the construction of drone comb.

The late W. Broughton Carr then invented a simple article which is now universally adopted by bee-keepers throughout the British Isles, and well answers its purpose. These small articles are stamped by machinery from one piece of tin, being turned out by the thousand. They are pushed on to each lug of the top bar of frames, and, where used, the distance between the comb centres can, to suit circumstances, be regulated from $1\frac{1}{2}$ inch to $1\frac{1}{4}$ inch.

Propolis is a sticky substance collected by bees from trees, and carried home as they carry pollen, on their hind legs, and is used to fill up small crevices in the hive for the sake of conserving heat. Rhodesian bee-keepers are fully aware that our native bees use great quantities of propolis, which is of a very adhesive nature, and, where these metal ends are used, very little surface is exposed or is in contact with its adjoining end. Where propolisation is so considerably reduced, it is a decided advantage when removing frames from a hive to find that only $\frac{3}{8}$ inch of surface is stuck to the adjoining end, in comparison to the frames in some makes of hives supplied without metal ends, and having 3 inches of surface glued fast by propolis to the adjoining frame. Besides this advantage, no bees can gain access to the lugs of the top bar, which are consequently free from propolis, while the fingers do not come in contact with this sticky substance.

(To be Continued.)

The Tobacco Sale.

The sale by auction of the 1911-12 Rhodesian tobacco crop was held in Salisbury in February, and resulted in an average price of 10 $\frac{3}{4}$ d. per lb. being obtained for the 925,000 lbs. of Virginia leaf put up to auction. This is the lowest average price yet realised at these auction sales since their inauguration in 1910, and this circumstance has given rise to some misgivings on the part of growers as to the future of the industry. Taking the crop generally, it cannot be said that the average quality was quite equal to that of the previous year, but apart from this, it is a matter of note that tobacco of good quality did not realise the prices previously paid for leaf of similar grade. Only one reason can be ascribed for this, and that is, that the amount of bright leaf, while not actually in excess of the demand, was ample for the existing requirements of the South African manufacturers. But this should not cause any great disquietude. The manufacturers are not going to indefinitely import from abroad tobacco which, with duty, costs them from 3s. 9d. to 4s. per lb. if they can obtain leaf in South Africa of quality sufficiently good for their requirements, at half the price.

We have at our doors an extensive market for our bright leaf. But we must have patience. The great tobacco industry of America was not built up in a day, nor was the universal demand that exists at the present day for Virginia tobacco created in a like period. Rhodesia tobacco has not yet captured the South African smoker, but it is making excellent headway, and there is no reason why the manufacturers should not in due course purchase the great bulk of their cigarette tobacco in Rhodesia. Smokers are a very conservative body, and the manufacturers are naturally chary of placing a new article before their customers. We have also the Rhodesian market to exploit, a market which still demands a considerable amount of foreign tobacco, as our importation statistics testify. Taking everything into consideration, we can see no reason for despondency, because prices have dropped from a level which we have long been warned could not be regarded as permanent.

To secure high prices, it is evident that we must grow a large proportion of high-class leaf. We must improve, there-

fore, the quality of our tobacco, and if we do this we shall find ample and remunerative scope for our labours for some considerable time to come.

Of course it is obvious that the time must arrive when our output of bright leaf will exceed the South African demand, and this is a question which has engaged the attention of the Administration, as will be seen from the report of the Director of Agriculture on the prospects of a market for Rhodesian tobacco in Australia. The opportunities of disposing of our surplus leaf there appear to depend mainly on questions of price, and it is interesting to note the good impression our tobacco has created in that country. At the prices ruling at the recent sale, it would most likely have paid Australian manufacturers to have purchased some of their supplies here. Details of the sale were sent to manufacturers in that country by the Director of Agriculture, and it is by no means unlikely that we shall see an Australian buyer at the next sale. But, of course, beyond advertising our tobacco, this is not likely to influence prices to any extent, for the Australian buyer will not naturally pay more, if as much, for Rhodesian leaf as he does for the American product.

The meeting of planters at the Town House on the 21st February, which was attended by Mr. Rochfort Maguire, members of the Government, and the representative of the United Tobacco Company led to the thorough ventilation of the views held by the different parties on matters of prime importance to the industry. Details of the discussions were fully reported in the Press at the time, and it is not necessary, therefore, to repeat these here, but there are one or two matters deserving of note. One, the guarantee given by the representative of the United Tobacco Company to only purchase tobacco at the auction sale, providing the Warehouse system is supported by the growers, is of great importance, and will be received with much satisfaction by all interested in the industry. Then the suggestion made by the representative of the United Tobacco Company that planters should be taught to grade their leaf, raises an important point, and one which will no doubt receive full consideration.

The meeting considerably cleared the air, and, it is to be sincerely hoped, had the effect of still more uniting planters in their common interests.

Departmental Correspondence.

Under this heading we publish correspondence passing between farmers and the Technical Officers attached to the Department of Agriculture, containing points which may be of general interest and assistance to our readers.

CITRUS CULTURE.

P.S., Hartley district, writes : Could you kindly give me a little advice regarding the planting of citrus trees? I have some land here which is nicely situated for irrigation purposes, so I thought of planting 1,000 citrus trees in it. . . . The soil is a light red, sandy in patches. I have to clear it all, it being all scrubby bush, with a few big trees and sugar bush. It is lying along the banks of the Umfuli River.

Reply.—The Government Agriculturist and Botanist replied : With regard to the question of citrus planting, I think, if your land is under irrigation, and is a moderately loose, well-drained, sandy loam soil, you could not do better than put down a citrus orchard. There is no doubt that where irrigation is available citrus trees, if properly cared for, will in a few years be extremely valuable. The site of the orchard should be well sheltered from the prevailing cold winds, either by natural bush or by the planting of wind breaks about 30 yards from the edge of the orchard. The best distance to plant your citrus trees is from 20 to 24 feet apart each way, and the varieties of orange which are recommended are Washington Navel and Valencia Late. If you decide to grow both varieties, however, you should separate them by means of a wind break of quick-growing trees, such as cypress, otherwise there is danger of hybridisation and consequent injury to the quality of the Navel orange. The most suitable cypress for the purpose would be *Cupressus arizonica*, *C. guadalupensis*, or *C. lusitanica*. It is also advisable to plant the Washington Navel orange on the windward side, and the Valencia Late on the leeward.

JAPANESE MILLET AND MUNGA.

A.B.F. writes : Would you please advise me if Japanese millet and munga are one and the same plant. Also the values of the latter (1) as a grain crop, and (2) as green fodder. Does it, at any period of its growth, contain a poison?

Reply.—The Agriculturist and Botanist replied : Japanese millet (*Panicum crus-galli*) is totally different to "munga" or "n'youti," pearl millet (*Pennisetum spicatum*). The latter is a common native crop, and the former is never grown by South African natives. Japanese millet is a quick-growing summer fodder crop, suitable for vleis soils, and somewhat similar in general feeding quality to Boer manna. Munga, as you are probably aware, is mainly grown for the seed, which is used in the making of kaffir beer, and for poultry feed. Neither crop at any stage of its existence possesses poisonous properties.

CLEANING CROPS FOR LANDS INFESTED WITH WEEDS.

J.B. writes : My lands this year are full of weeds and grass. Would you be good enough to let me know the best crops to sow next year to kill or reduce same, and the price such crops would be likely to realise. . . . I cultivated the whole of the lands about three times.

Reply.—The Agriculturist and Botanist replied : The best and most reliable crop for cleaning lands infested with weeds is, in my opinion, Teff grass, but Boer manna can also be utilised. Teff grass, sown under normal conditions in December, will give a cutting for hay in about two months, and later on should give either another cutting for seed or a good aftermath for grazing. Owing to its rapid growth Teff grass usually outgrows weeds and smothers them, but if for any reason this is not the case during the first month or six weeks, a mowing machine should be run over the land and the whole crop cut down. The second growth of the Teff is then usually able to overcome the weeds. Being a comparatively shallow-rooted grass and also an annual, Teff is not likely in itself to prove a troublesome weed in arable lands.

The usual sowing is about 5 to 7 lbs. per acre, but where used as a smother crop, a pound or two more of seed may be put in. The seed is usually sown broadcast, mixed with about three times its bulk of sand or finely-powdered earth. The cost of the seed is about 6d. to 8d. per lb.

After seeding, the land should be lightly harrowed and, if possible, rolled when the crop is an inch or two high. If, however, a roller is not available, a disc harrow may be used immediately after sowing and prior to germination. Boer manna is sown in the same manner, but about 15 lbs. of seed is used per acre, and, owing to its slower growth, the crop is not so valuable for smothering weeds.

PASPALUM.

W.M.W. writes: Will it be necessary before planting paspalum slips to plough the land, or can I just plant them in the veld after loosening the soil with a hoe, and what distance apart must I plant them?

Reply.—The Agriculturist and Botanist replied: In regard to planting this grass, if you wish to obtain a good stand, it is always advisable to first plough the land. Paspalum will fight its way against the native grasses, but naturally under these conditions its progress is slower. In ploughed land I recommend planting the slips in rows about $2\frac{1}{2}$ feet apart and about 12 to 15 inches distant in the rows.

It is not a bad plan to establish your paspalum under a growing crop of maize, the plants being put in after the last cultivation. This, of course, can only be done when the land under consideration is not required for arable purposes.

The best results with paspalum are usually obtained when planted in moisture retaining soil.

Correspondence.

TERMITES.

To the Editor,

Rhodesia Agricultural Journal.

Sir,

I am assured by a firm in Gwelo, who are themselves using same in building with brick, that tar mixed in the mortar will prevent ants ascending the walls. It would no doubt be advisable to add the zinc damp course too. I know of a dagga and wattle building that was overrun by white ants, and, to prevent this, it was re-plastered with a mixture of lime, dagga and arsenic (arsenic mixed in water when mixing the mortar), since when not an ant has touched it or appeared in the walls.

With reference to poles, I have a mealie hock still in good order built four years ago—the poles are all mopani and peeled, afterwards painted with solignum (green). It has not been touched since it was built, and not an ant has gone up it.

I would suggest as an effective prevention, zinc course of lime, sand and tar.

Yours, etc.,

R. W. T.

Gwelo, 20th February, 1913.

BEEES.

To the Editor,

Rhodesia Agricultural Journal.

Sir,

Can you give me any remedy to stop wild bees from trying to swarm in my house? Last year I had the greatest difficulty

in getting rid of them, and now two more swarms have come along, one having taken up its abode in the roof, and the other is now in the dining room.

Yours, etc.,

H. D. ZIMMERMANN.

Alderley Farm,
13th January, 1913.

Reply.

I would advise you to purchase one bottle of Calvert's No. 5 carbolic acid from the chemist, costing about 1s. 6d., and to sprinkle this fluid (undiluted) close to where the bees have settled; the place where they enter and leave the roof should also be sprinkled about 9 a.m. The swarm in the dining-room can, after the windows have been opened, also be treated in a similar manner. Owing to the fact that bees have a great aversion to the scent of carbolic acid, there is no necessity to sprinkle it directly on them, thus causing their total destruction. In order to avoid damage to furniture, the carbolic acid can be sprinkled on pieces of old linen. These fabrics can be moved from place to place according to circumstances, and the bees will quickly decamp. Should any bees again shew signs of returning, an occasional application of the fluid will prevent their reappearance.—(Ed.)

Veterinary Report.

January and February, 1913.

SALISBURY.

AFRICAN COAST FEVER.—*Fresh Outbreak.*—On the 1st January Assistant Veterinary Surgeon White went to the farm The Grange, about eight miles east of Salisbury, to enquire into some illness amongst the calves. A few days previously a calf had died, and the microscopic examination of smears demonstrated the existence of acute redwater and anaplasmosis. Whilst inspecting the herd, Mr. White noticed a two-months'-old calf with enormously enlarged glands, those below the ears especially attracting attention. Smears were taken from these, and microscopic examination revealed the presence of innumerable Koch's bodies. This diagnosis was confirmed by Mr. W. Robertson, Acting Director of Research for the Union of South Africa. The calf was isolated, and smears taken daily until death. The Koch's bodies persisted, but no *T. parva* could be found in the blood either before or after death. *Post-mortem* examination shewed enormous enlargement of the spleen and all lymphatic glands, and profuse characteristic infarction of both kidneys. Immediate steps were taken for fencing the farm and the erection of a dipping tank. Temperatures are taken daily, and the cattle are sprayed every third day. No further cases have occurred.

Existing Outbreak.—No further cases on the infected section of the Commonage.

RABIES.—Four rabid dogs were destroyed in Salisbury. At the Veterinary Laboratory one of the working oxen appeared strange in its behaviour, bellowing and charging, and finally becoming paralysed was destroyed. Experimental tests shewed that the animal was affected with rabies.

OPHTHALMIA.—This disease, which has not been much in evidence during the last three years, has occurred in many herds.

SPIROCHAETOSIS.—The Government Veterinary Bacteriologist met with a case in a calf born on 26th December, 1912, from a heifer imported from Vryburg. This is the fourth case he has encountered during the last four years.

ANAPLASMOSIS.—This disease has been very prevalent amongst calves, especially those of the better breeds, and amongst young stock imported from the Cape and Orange Free State.

REDWATER.—The regular dipping of cattle on Salisbury Commonage has resulted in a susceptibility of calves which, when infected, suffer an acute attack of Piroplasmosis.

INOCULATION AGAINST PLASMOSES.—The Government Veterinary Bacteriologist reports having inoculated 55 head of calves and yearlings on the farm Pomona, where the cattle have been regularly dipped for some years now. Two died from Piroplasmosis and one from Anaplasmosis. This mortality might not have occurred if the animals had not been exposed to inclement weather. Even with this loss, the increased development of young stock fully justifies the eradication of ticks and the diseases they transmit.

TRYPANOSOMIASIS.—In blood smears from a yearling bullock on Umtali Commonage the Government Veterinary Bacteriologist found *Try. Theileri*. This is the second record of this trypanosome in Southern Rhodesia.

The Government Veterinary Bacteriologist also reports he received a sheep from Dr. MacKenzie from a kraal on the Umniati River, Hartley district. On examination, its blood was found swarming with trypanosomes differing markedly from those hitherto encountered in animals from the Hartley district, but more nearly resembling *T. Brucei* of that variety, which has been met with in the Sebungwe district.

MALLEIN TEST.—Two horses were tested on importation and found free from glanders.

HORSESICKNESS INOCULATION.—Three mules were inoculated. No deaths.

BULAWAYO.

AFRICAN COAST FEVER.—At Collaton, one beast died, bringing the total mortality up to 411 out of 1,050 head. A recrudescence of the disease occurred on the Wollendale (Alnwick) Estate. One beast died. The herd is being temperatured and dipped every third day.

ANTHRAX.—No further developments on the infected farm Umganin.

MALLEIN TEST.—The following animals were tested and found free from glanders (including Plumtree and Gwanda):—Horses 5, Mules 17, Donkeys 196.

IMPORTATIONS.—Bulls 7, Heifers 141, Sheep and Goats, 5,158.

PLUMTREE.

LUNGSICKNESS (Contagious Pleuro-pneumonia).—All restrictions were removed at the end of February.

UMTALI.

AFRICAN COAST FEVER.—No fresh outbreaks and no further cases on the infected section of the Commonage. Date of last case, March, 1912.

REDWATER AND GALLSICKNESS.—Several deaths reported.

MALLEIN TEST.—One horse tested on importation and found free from glanders.

GWELO.

REDWATER AND GALLSICKNESS.—Amongst a consignment of Devon and Red Polled heifers recently imported from the south, six died from these diseases.

HORSESICKNESS INOCULATION.—Eleven mules inoculated. No deaths.

VICTORIA.

RABIES.—One suspected case reported.

MELSETTER.

MALLEIN TEST.—One horse and three donkeys were tested with Mallein on importation and found free from glanders.

GENERAL.

HORSESICKNESS.—So far, the present season is one of the worst on record in Mashonaland. It is impossible to obtain statistics, but a very heavy mortality is reported from the various districts.

RINDERPEST.—The Assistant Chief Veterinary Surgeon visited German East Africa to enquire into the spread of rinderpest in that territory and methods used in combating it. The following statement is based on his report :—

“Rinderpest was introduced into German East Africa from British East Africa. As far as known it exists at three centres, but is suspected to exist at two other centres near Lake Nyanza.

Method of Combating the Disease.—When an outbreak occurs the district is placed in quarantine, and no cattle are allowed to be moved out of it. Skins, butter, etc., are allowed out under certain conditions. Various methods of inoculation are used. Good results have been obtained with serum, and serum and virulent blood. Bile has been used, but the results have not been so good as with serum. The mortality in infected herds after treatment varies up to 30 per cent.; the heaviest has been after bile inoculation.

Virulence of the Disease.—So far the experience in German East Africa is that rinderpest is of a much milder type than during the former visitation. It is significant that although game abounds all over the country it has not so far

been observed in any species. It is possible, however, that game contracts the disease in a very mild form, which, however, would be sufficient to carry infection from one place to another.

Spread of the Disease.—Considering that there are over three million head of cattle in German East Africa, the disease cannot be said to have spread rapidly. No extension of the disease southwards has occurred since December last.

Possibility of the Disease Spreading Southward to Rhodesia and Portuguese East Africa.—That portion of German East Africa which adjoins Portuguese territory is grossly infected with tsetse fly, and contains practically no cattle. There is little danger, therefore, of the disease travelling southward to Portuguese territory through the medium of cattle. The game certainly is a danger, but it is impossible to adopt any measures to overcome this danger. On the south of the Ruaha River there is a belt which carries very few cattle. To the south of this again, and adjoining Northern Rhodesia and Nyasaland, there are great numbers of cattle, and, should the disease extend to this area, there is a grave possibility of its crossing into Northern Rhodesia and Nyasaland.

Measures to be adopted by Rhodesia and the other Southern States.—A conference of the principal Veterinary Surgeons of the Union of South Africa, Basutoland, Bechuanaland, Northern Rhodesia, Nyasaland, Portuguese East Africa and Southern Rhodesia will be held in Bulawayo to discuss the matter, and advise as to the best means of combating the disease should it extend south from German East Africa. Meantime this Administration and the Union Government have agreed to establish a joint serum station, and negotiations to this end are now proceeding, but up to the present no definite arrangement has been made. The German Government is establishing a large serum station at Dar-es-Salaam. It will take about six months to complete this station and get it into working order. They then hope to be able to produce serum in large quantities and possibly supply us with some."

J. M. SINCLAIR,

Chief Veterinary Surgeon.

Garden Calendar.

April and May.

By N. L. KAYE-EDDIE.

FLOWER GARDEN.

Most flowers which have bloomed during the summer months now gradually cease flowering, and the beds will require well working up before winter flowering plants are put in. Dahlias and chrysanthemums will now cease blooming, and should be cut down as soon as the stems shew decay. Carnations require attention, and should be kept free of old blooms, especially if they shew signs of rust from continual rains. The ground around the stems should be kept free and loose. If the ground has been well manured or mulched, this will greatly assist in keeping in the moisture during the cold dry months which follow; and it must not be forgotten that the constant stirring of the surface is also advantageous to this end.

Sweet Peas.—If not already sown, these should be planted during the first half of April. Choose a site against a fence or trellis, otherwise plant in rows, as the plants attain a height of over 6 feet and must be staked. Sow the seeds from 4 to 6 inches apart. The soil should be trenched and thoroughly worked and manured. As the plants will require a lot of water and attention later, convenience of both should be considered.

Cuttings may be planted from most perennials and shrubs. Hardwood cuttings are best taken when it is seen that the sap is down. They should be kept warm and moist, care being taken in watering to give just sufficient moisture, as an excess tends to rot the cutting, especially if there is much organic matter in the soil used.

VEGETABLE GARDEN.

Potatoes require ridging and tomatoes staking and tying up. Potatoes which mature after the rains may generally remain in the soil and be lifted as required. Vegetables planted out for winter crops should be well and continuously cultivated, which will bring them along quicker with less watering. Beans and peas should be staked and tied. Beans, cabbage, cauliflower, peas, turnip, spinach, beet and radish should be sown for late winter crops.

Market Reports.

26th March, 1913.

The produce market in Salisbury is well supplied, and prices are normal. Mealies are easier owing to various stocks being released. There is a strong demand for locally made butter, but the supply is short. Eggs are scarce.

At Bulawayo mealies have risen in price owing to prices in the Transvaal hardening.

~~Local hay is cheaper,~~ although it is fetching 70s. per ton.

Article.	Johannesburg.	Kimberley.	Bulawayo.	Salisbury.
Barley, 150 lbs.	11/6 14/6	12/0	30/0	30/0 32/6
Beans, 203 lbs.	27/6 48/0	36/0 40/0	42/6	40/0
Boer Meal, unsifted, 200 lbs.	—	26/6 27/6	43/0 44/0	37/6
Bran, wheat, 100 lbs.	7/9 8/3	6/6 7/6	—	16/0 17/6
Flour, 100 lbs.	—	—	25/6 26/6	20/0 23/6
„ Colonial, 100 lbs.	—	17/6	23/6 24/6	none
Forage, 100 lbs.	5/6 6/0	—	10/0 11/0	7/6 9/0
„ Colonial Oat	5/3 5/6	—	—	none
Hay	Bale. 8d. 1/0	—	Ton. 70/0	Ton. 60/0 70/0
Kaffir Corn, 200 lbs.	21/0 22/6	19/3 20/6	27/0 27/6	none
Manna, 100 lbs.	—	—	—	5/0 6/0
Mealies, S.A. White, 203 lbs.	17/9 18/3	18/6 20/0	25/6 26/6	20/0 21/0
Mealies, Yellow, 203 lbs.	16/9 17/3	17/6 19/0	24/0 25/0	none
Mealie Meal, White, 183 lbs.	23/0	—	25/0	20/0 22/0
Munga, 200 lbs.	—	—	27/0	25/0
Monkey Nuts, bag	—	—	18/6 20/0	18/6
Oats, 150 lbs.	10/0 12/6	—	21/6 22/6	25/0 27/6
Onions, 120 lbs.	7/0 9/6	4/0 8/0	16/0 18/0	22/6 25/0
Peas, 200 lbs.	—	—	—	none
Potatoes, new, 150 lbs.	8/6 10/6	3/6 12/6	14/0 22/0	10/6 12/6
„ old, 150 lbs.	4/6 7/6	—	—	none
Rapoko	—	—	—	27/6 30/0
Rye, 200 lbs.	20/3 21/6	—	—	none
Salt, 200 lbs.	5/0 5/6	3/0 4/0	10/6 11/0	11/6 12/6
Wheat, 203 lbs.	21/6 24/9	21/0 24/0	30/0	30/0
Butter, local, per lb.	9d. 1/2	1/3	1/6	2/0
Eggs, local, per dozen	3/0	2/5 2/8	3/6 4/0	4/6
Ducks, each	1/6 2/6	2/6 3/3	5/0	4/6 5/0
Fowls, each	1/0 2/6	1/3 2/6	1/8 1/10	4/6 5/0
Geese, each	3/0 3/9	—	9/0	10/0
Turkeys, cocks, each	—	3/6 10/0	15/0	17/6 20/0

LIVE STOCK.

Slaughter Cattle, 100 lbs.	37/6	—	40/0	40/0
Trek Oxen, trained	£8/10 £9	£7/10 £8/10	£8/10 £12	£10
Local Cows, milk	£18	£8 £14	£25 £30	£25
Dairy Cows	£20	—	£25 £35	£25 £30
Native Cows	—	—	—	£9 £10
Heifers, Colonial	£6 £7	—	£10 £17/10	£9 £11
„ Native	—	—	—	£7
Pigs, live weight	2½d.	2d. 3½d.	3d. 4d.	4½d.
Horses, riding, salted	—	—	—	—
„ „ unsalted	£17	£10 £25	£25 £35	£25
Mules, inoculated	—	£18 £25	£35 £40	£20 £35
Donkeys, geldings	£5	£5 £7	£7 £8/10	£6
„ mares	—	£6 £7/10	£8/10 £10	£7 £8
Goats	8/0	—	—	10/0 12/0
Persian Ewes	22/6	—	—	18/6 21/0
Cross-bred Ewes	—	—	—	—
Sheep, slaughter	20/0	11/6 16/0	25/0 27/6	23/0 25/0

Weather Bureau.

TEMPERATURES.

STATION	JANUARY		FEBRUARY	
	Max.	Min.	Max.	Min.
MASHONALAND—				
Charter, Grootfontein ...	84·6	55·2	x	x
Hartley, Giant Mine ...	85·6	64·0	83·0	64·6
„ Hallingbury Farm ...	86·0	59·7	82·6	61·2
Lomagundi, Sinoia ...	92·1	53·6	85·0	53·8
Melsetter, Government Offices ...	72·2	56·7	74·7	59·6
„ Mount Selinda ...	77·8	62·2	77·7	64·3
Salisbury, Agricultural Laborat'y ...	79·5	58·6	78·2	59·4
„ Chishawasha ...	80·3	58·3	79·4	59·9
„ The Gaol... ..	79·9	58·2	78·5	59·3
„ Shamva Mine ...	82·3	61·9	82·2	62·4
Umtali, Chiconga's Location ...	86·5	62·9	85·6	64·5
„ Summerfield ...	74·6	57·3	75·4	59·8
Victoria	83·8	62·5	83·1	64·9
MATABELELAND—				
Bulawayo, Essexvale ...	88·4	65·2	83·8	65·8
„ Observatory ...	85·4	62·0	81·4	63·0
„ Rhodes Matopo Park... ..	89·7	61·4	83·8	62·5
Gwelo, The Gaol ...	84·7	58·8	81·0	61·2
Mangwe, Empandeni ...	80·6	64·4	84·3	65·2
Tuli, Police Camp ...	98·4	72·0	95·4	71·5
Wankies, Victoria Falls ...	92·2	64·4	85·7	65·0

RAINFALL.

STATION	Jan.	Feb.
MASHONALAND :		
Charter—		
Enkeldoorn	1·96	9·07
Grootfontein	1·25	x
Marshbrook	3·03	5·15
The Range	x	10·26
Rhodesdale Estate	0·55	7·73
Riversda'e	1·19	5·13
Umvuma (Railway)	Nil	12·40

RAINFALL—(Continued).

STATION				Jan.	Feb.
MASHONALAND—(Continued)					
Hartley—					
Ardgowan	...	...	...	7.06	11.96
Battlefields (Railway)	...	...	...	2.91	8.06
Carnock Farm	...	...	...	x	9.55
Elandsfontein	...	...	...	5.30	8.47
Elvington	...	...	...	4.32	11.86
Franceys	...	...	...	5.66	10.42
Gatooma	...	...	...	4.02	10.58
Gatooma (Railway)	...	...	...	2.98	10.62
Giant Mine	...	...	...	4.13	8.24
Gowerlands	...	...	...	5.62	10.51
Hallingbury	...	...	...	3.09	8.73
Hartley (Gaol)	...	...	...	x	x
Hartley (Railway)	...	...	...	4.42	7.40
"Jenkinstown"	...	...	...	8.22	13.19
Makwiro	...	...	...	7.30	6.68
Shagari	...	...	...	3.74	10.88
"Stoneygate"	...	...	...	2.26	9.19
Lomagundi—					
Banket Junction (Railway)	...	...	...	3.99	13.72
Darwendale	...	...	...	4.90	7.99
Duxbury Farm	...	...	...	7.65	8.81
Eldorado (Railway)	...	...	...	4.27	11.02
Kanyemba	...	...	...	4.25	8.40
Lone Cow Estate	...	...	...	5.64	x
Palm Tree Farm	...	...	...	3.17	11.37
Sipolilo	...	...	...	x	x
Sinoia	...	...	...	8.19	x
Makoni—					
Eagle's Nest	...	...	...	4.86	8.73
Inyanga	...	...	...	7.64	9.24
Monte Cassino	...	...	...	3.46	10.00
Rusape	...	...	...	1.92	6.81
Rusape (Railway)	...	...	...	2.85	6.85
York Farm	...	...	...	5.47	10.80
Mangwendi—					
Bonongwe	...	...	...	3.05	5.76
Glen Somerset	...	...	...	7.03	8.84
"Good Hope"	...	...	...	4.91	7.19
Land Settlement Farm	...	...	...	3.84	8.04
Macheke (Railway)	...	...	...	4.85	9.45
Marandellas (Railway)	...	...	...	5.93	8.99
Mrewa	...	...	...	5.80	7.13
Mtoko	...	...	...	10.10	5.33
Mungo Estate	...	...	...	x	x
Rusawi (Outspan)	...	...	...	6.52	8.84
Selous Nek	...	...	...	10.01	6.69
Tweedjan	...	...	...	4.64	11.78
Mazoe—					
Avonduur	...	...	...	4.47	7.54

RAINFALL—(Continued).

STATION			Jan	Feb.
MASHONALAND—(Continued)				
Mazoe (Continued)				
Chin Mine, Mount Darwin	...	...	3·84	9·81
Claverhill	...	...	2·42	7·53
Dunmaglas	...	...	4·02	8·88
Kimberley Reefs	...	...	1·65	x
Laguaha	...	...	4·47	6·13
Lowdale	...	...	4·56	6·56
Mazoe	...	...	5·64	7·64
Mount Darwin	...	...	2·80	10·50
Omeath	...	...	3·40	6·55
Sleamish	...	...	5·21	5·43
Sunnyside	...	...	4·59	8·91
Teign	...	...	6·59	8·55
Umvukwe Flats	...	...	4·46	12·86
Melsetter—				
Chikori	...	...	5·39	12·56
Chipinga	...	...	4·30	11·69
Helvetia	...	...	4·20	16·73
Mutambara Mission	...	...	1·89	12·36
Melsetter	...	...	5·74	9·96
Mount Selinda	...	...	4·98	13·07
Tom's Hope	...	...	3·52	9·52
Vermont	...	...	6·40	13·83
Salisbury—				
Agricultural Laboratory	...	...	6·26	9·28
Avondale	...	...	6·22	9·84
Brookmead	...	...	3·02	x
Chishawasha	...	...	4·46	10·56
Cleveland Reservoir	...	...	5·65	9·51
Goromonzi	...	...	x	x
Hillside	...	...	5·03	9·09
Meadows	...	...	4·68	9·25
Public Gardens	...	...	6·26	7·48
Rhodesville	...	...	x	x
Salisbury (Gaol)	...	...	7·52	7·25
„ (Railway)	...	...	6·41	7·37
Shamva	...	...	6·60	7·02
„ Mine	...	...	6·61	8·17
Stapleford	...	...	5·55	x
Westridge	...	...	6·90	x
Umtali—				
Chiconga's Location	...	...	0·75	x
Champion Mine	...	...	1·25	7·44
Gaol	...	...	x	x
Premier Estate	...	...	1·36	8·04
Selim Mine	...	...	2·61	8·83
Summerfield	...	...	3·71	x

RAINFALL (*Continued*).

STATION				Jan.	Feb.
MASHONALAND—(Continued)					
Umtali (Continued)					
Umtali (Railway)	...	...	...	2.53	10.57
Utopia	...	...	...	1.55	11.23
Victoria—					
Chibi	...	...	...	3.18	8.98
Chilimanzi	...	...	...	1.82	7.28
Chingombie	...	...	...	0.95	5.37
Chiredzi Rancho, Ndanga	...	...	...	2.17	4.72
Empress Mine	...	...	...	1.68	10.88
Gokomere	...	...	...	1.91	9.02
Gutu	...	...	...	2.61	9.35
Halliday's Farm	...	...	...	2.62	12.44
Marah Rancho	...	...	...	3.22	7.31
Marthadale	...	...	...	3.16	9.77
Morgenster	...	...	...	3.42	17.06
Noeldale	...	...	...	1.64	13.06
Pamushana	...	...	...	3.99	8.47
Silver Oaks	...	...	...	2.37	11.43
Victoria	...	...	...	2.76	12.41
MATABELELAND :					
Belingwe—					
Dawn Farm	} Native district of Insiza.			3.15	9.48
Filabusi				1.89	5.06
Fort Rixon				3.55	6.22
Infiningwe				2.02	7.55
Insiza (Railway)				1.10	9.00
Thornville				1.15	8.76
Tamba	...	...	...	0.18	7.31
Bubi—					
Inyati	...	...	...	3.21	8.27
Bulalima—					
Figtrees	...	...	...	2.68	10.39
Magot	...	...	...	2.14	6.30
Marula	...	...	...	3.83	6.62
Plumtree	...	...	...	3.11	5.38
Solusi	...	...	...	1.76	7.83
Syringa	...	...	...	0.79	x
Tegwani	...	...	...	1.17	4.81
Bulawayo—					
Balla Balla (Railway)	...	...	...	1.43	5.36
Bembesi (Railway)	...	...	...	1.95	9.40
Dewhurst	...	...	...	x	6.95
Edwaleni	...	...	...	x	x
Essexvale	...	...	...	1.30	8.60
Government House	...	...	...	1.30	8.35
Gwaai (Railway)	...	...	...	1.58	9.14
Heany Junction (Railway)	...	...	...	2.19	9.94

RAINFALL (*Continued*).

STATION			Jan.	Feb.
MATABELELAND—(Continued)				
Bulawayo (Continued)				
Hope Fountain	...	...	2.01	10.29
Imbesa Kraal	...	...	3.29	8.30
Khami	...	...	2.68	10.12
Lochard Experiment Farm	...	...	1.14	x
Matopo Mission	...	...	2.79	9.43
Maxim Hill	...	...	2.35	7.12
Melinakanda Junction	...	...	2.31	7.18
Mpondeni	...	...	2.18	x
Nyamandhlovu	...	...	4.71	8.11
Observatory	...	...	1.27	9.41
Pendennis	...	...	2.98	8.36
Raylton	...	...	0.96	9.92
Rhodes Matopo Park	...	...	2.47	x
Umgusa	...	...	5.75	x
Gwanda—				
Antelope Mine	...	...	0.81	6.26
Gwanda (Railway)	...	...	0.22	6.24
Malundi	...	...	1.15	4.84
Mtshabzi Mission	...	...	1.27	5.65
West Nicholson (Railway)	...	...	0.11	5.65
Gwelo—				
Globe and Phoenix (Railway)	...	...	1.91	9.91
Gwelo (Gaol)	...	...	0.77	12.49
Gwelo (Railway)	...	...	0.58	12.03
Lalapanzi	...	...	1.72	13.81
Lower Gwelo	...	...	0.66	8.42
Que Que	...	...	1.83	11.86
Selukwe (Railway)	...	...	2.57	15.86
Shawlands	...	...	0.89	9.22
Mangwe—				
Empandeni	...	...	1.32	3.95
Garth	...	...	2.09	6.32
Sebungwe—				
Gokwe	...	...	2.95	10.08
Tuli—				
Lamulas (Liebig's Estate)	...	...	0.56	7.63
Makalali	..	...	2.66	8.11
Manyoni	..	...	0.71	6.25
Mazunga	..	...	0.48	6.88
Tuli	...	...	0.56	5.06
Wankies—				
Malindi (Railway)	...	...	1.60	6.33
Victoria Falls (Police Camp)	...	...	3.00	6.81
Victoria Falls (Railway)	...	...	3.51	7.52
Wankies Hospital	...	...	2.67	6.20
Wankies (Railway)	...	...	2.70	5.30

x No return received.

Dates of Meetings of Farmers' Associations, Southern Rhodesia

(SUBJECT TO ALTERATION)

Name of Association	Place of Meeting	Secretary	1913		
			April	May	June
Charter-Mgezi	Mgezi River	W. Kriener	25	28	27
Central	Unvuna	C. Napier	25	30	27
Enterprise	Arcurus Hotel	R. Philip	8	13	10
Figtree Branch, R.L. and F.A.	Figtree Hotel	A. Curdis	..	10	..
Gatooma	Gatooma	R. F. Thomas	..	..	..
Gazaland	Chipinga	L. Dolcl	24	..	..
Harley	Commercial and Flanders Hotels, Harley, alternately	..	..	..	..
Headlands	Headlands Siding	L. Savory	12	10	7
Insiza	Insiza Station	J. Harvard	..	31	..
Kimberley Reefs	Trusson's Hotel	F. D. Jones	5	..	..
Lalapanz	Lalapanz Hotel	S. E. Ford	18	11	20
Lonagundi	Sinola	B. Smit	..	16	..
Macheke	Macheke	J. N. Bateman	..	17	..
Makoni	Rusape	H. H. Kidson	5	3	7
Makwiro	Makwiro	W. S. Tapson	19	17	21
Manica	Xmas Pass Hotel	A. B. Fraser	5	3	7
Marandellas	Marandellas	J. S. Holland	5	3	7
Mangwendi	Fixed every meeting	C. M. Wright	..	2	..
Martula	Martula Siding	MacW. Ingram	26	24	28
Mashonaland	Langham Hotel, Salisbury	W. H. Williamson	11	9	13
Matopo Branch, R.L. and F.A.	Matopani Hotel	W. E. Dowsett	..	..	..
Mazoe	Various Farm Houses	N. Rutherford	..	..	..
Melsetter (North)	Gwelo	M. L. Price	..	..	..
Midlands	Farm "Summerfield"	R. O. H. Bleurton	12	10	14
Northern	Plumtree	H. J. Brooke	5	..	..
Northern Untali	Globe & Phenix Hotel	E. E. Somerset	4	17	6
Que Que	Bulawayo	H. S. Hopkins	19	17	21
Rhodesian Landowners and Farmers	Shanva	J. M. Moulray	25	30	27
Shanva	Farm "Fairview"	S. Annandale	No dates	..	fixed
Sonahula and Shangani Plains	Victoria	J. Rutherford	5	3	7
Victoria	Victoria	..	16	21	18

Departmental Notices.

Information for Farmers

The Department of Agriculture is prepared to furnish to farmers technical advice either by correspondence, or, where possible, by personal visits. All communications should be addressed in the first instance to the Director of Agriculture.

Crops

The Agricultural Branch deals with enquiries relating to agricultural practice, soils, crops, cultural operations, processes, seeds, trees, farm implements and machinery, etc.

Poisonous Plants

It is of great importance that as soon as possible a study should be made of those plants found in Southern Rhodesia which are poisonous or deleterious to small or large stock. Farmers and others who have known, or suspected poisonous plants on their property, are requested to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, at the same time forwarding specimens of the plant, including stem, leaves, flowers, and, where possible, fruit. Any particular regarding the habits of the plant will be welcomed, and in return the Department will supply all available information regarding the plants.

Disposal of Seeds

All farmers and others who have surplus supplies of good quality locally grown farm seed of any description are invited to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, stating what

quantities are available for sale, and price f.o.r. nearest station. In all cases representative samples of the grain must accompany the letter, but need not exceed two ounces in weight.

The Agricultural Department is continually receiving enquiries as to where various seeds can be obtained, and it is hoped that by the above means growers of reliable seed may be brought into touch with one another.

It must be clearly understood, however, that beyond recommending sources of supply, the Department cannot take any further part in the transaction.

Tobacco

The services of the Tobacco Expert are available to all desiring advice on the subject. Applications should be accompanied by particulars of the nature of the information sought, also the distance and direction of the farm from some well known centre.

Live Stock

The Animal Industry Branch is prepared to advise with regard to all matters connected with stock breeding, selection, feeding and registration of stud animals, the dairy industry, poultry management, farm buildings for stock, and kindred subjects. Buyers and sellers of stud stock in Rhodesia are also put in touch with one another.

Purchase of Stock in the Cape and Free State Provinces of the South African Union, on behalf of Farmers resident in Southern Rhodesia

The following amended arrangements are published for general information :—

The Government undertakes the purchase of pure-bred live stock for farmers on the conditions outlined below, and on the following terms of payment, viz. :—(1) a deposit on application; (2) one-third total cost on delivery, less amount of

deposit; (3) one-third after six months, and (4) one-third after twelve months—both these instalments bearing interest at 6 per cent. or 10 per cent. if not paid at due date. These terms of credit will only be allowed on purchases up to a total maximum value of £200; sums exceeding that amount are payable in cash along with the first instalment. The Government reserves the right to refuse, without reason given, applications, or to fulfil purchases even after deposit has been made. Applications must be on the prescribed Form "A," and all conditions complied with before same is registered. Applications will be considered in rotation, but fulfilled as opportunity serves, so that animals may be procured as cheaply as possible. The buyer must undertake to accept the animal allotted to him, unless it fails to satisfy description as given in the application form. Disputes may be submitted to arbitration. The purchase price will include all expenses up to time of delivery, price paid to original owner, commission and charges of buyer and freight, including, where necessary, attendance and keep on journey. With every application a deposit must be forwarded; £1 per head in the case of cattle, horses and donkeys, and 5s. per head for sheep, goats and pigs. Such deposit will be deducted from the amount of the first instalment due, but may be forfeited in the event of the application being withdrawn after having been registered. Stock is not to be disposed of without the written consent of the Director of Agriculture until payment is completed.

Purchases will be made by the Department of Agriculture through its authorised representatives. Every effort will be made to secure animals in accordance with particulars furnished by applicants, and to the best advantage. All purchases must conform strictly to the importation regulations as regards age and freedom from contact with contagious disease. Pedigrees, if obtainable, will be supplied. The Government will bear all risks of transport and of death from any cause until delivery, all losses being chargeable to the vote. All animals failing to pass the necessary test on arrival shall be destroyed and the loss borne by the Government, and another animal purchased for the applicant.

Prospective buyers will be advised of the probable cost. The Department does not undertake to purchase stock at precisely the prices specified by applicants, but will endeavour to

approximate as nearly as possible to the figures given and not to exceed same by over 20 per cent. The authorised representatives of the Department will be allowed a reasonable commission, with expenses additional.

The first instalment will become due and payable on delivery. Applicants or their agents will be advised regarding arrival of their stock, after which all responsibility on the part of the Department will cease.

Entomology

The Government Entomologist advises on matters connected with insect pests of live stock, crops, and fruit trees, and also undertakes the inspection of nurseries and of the importation of plants from abroad.

Chemical Analyses

The Government Agricultural Chemist deals with matters relating to the composition of soils, fertilisers, farm produce of vegetable or animal origin; also the investigation of poisons and of articles of potential economic value.

Nominal charges are made, which, while not covering the cost, will help to defray the expense and serve as a proof of good faith. Samples, carriage prepaid, together with full particulars regarding the subject should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

A schedule of charges and directions for taking samples will be furnished on application.

With all analyses, reports will be furnished explanatory of the results and, when possible, advice given as to the nature, properties and value of the material.

No charge will be made for analysis where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Services of Government Veterinary Surgeons

1. The services of Government Veterinary Surgeons are available to the public, free of charge, for the following purposes only :—

- (1) Attending and giving professional advice in connection with the following diseases, viz. :—Anthrax, Contagious abortion, East Coast Fever, Epizootic Lymphangitis, Foot and Mouth Disease, Farcy, Foot-rot, Heartwater, Glanders, Intestinal parasites amongst sheep and goats, Liver Disease, Lungsickness, Osteo Porosis, Malarial Catarrhal Fever (blue tongue), Rabies, Redwater, Rinderpest, Scabies, Sponziekte (quarter evil), Swine Fever, and any other diseases which may in future be scheduled in terms of section 3, sub-section 18 of the "Animals Diseases Consolidation Ordinance, 1906." Attending to cases of disease amongst live stock which, though not of a contagious or infectious character, may be of general public importance.
- (2) Applying tests in regard to Glanders, Tuberculosis, or any other disease against the introduction or spread of which tests are applied under regulations.
- (3) Inoculations against the following diseases :—

Horsesickness, Lungsickness, Anthrax, Quarter Evil, Redwater, Malarial Catarrhal Fever (blue tongue). A fee to cover the cost of serum and virus will be charged.

2. The following charges shall be made and payable for services rendered by the Government Veterinary Surgeons in other cases, viz. :—

	£	s.	d.
(1) For every professional visit within three miles of his office or residence	0	5	0
(2) For every professional visit beyond such distance	0	10	6
plus an additional charge of 2/6 per hour whilst engaged in such visits or £2/2/0 a day of 24 hours ;			

	£	s.	d.
(3) For advice given at the Veterinary Surgeon's office, for each animal, per visit	0	2	6
(4) The following to be charged in addition to visiting fees :—			
a. For every examination as to soundness, each	1	1	0
b. For castration, horses, each	1	1	0
c. For castration, bulls, each	0	5	0
d. For castration, donkeys, each.. ...	0	10	6
e. For parturition cases, mares, each	2	2	0
f. For parturition cases, cows, each..	1	1	0
g. For other operations, according to nature, from 5/- to £2/2/0.			

3. Double the above fees will be payable for services rendered on Sundays, public holidays, and between the hours of 7 p.m. and 7 a.m.

4. Applicants for the services of Government Veterinary Surgeons must at their own cost provide the necessary transport for the conveyance of these officers from, and back to, their residence or nearest railway station.

5. Farmers and owners of stock throughout the country frequently telegraph for a Government Veterinary Surgeon to be sent to attend an animal which has been taken seriously ill. It is rarely possible to comply with these requests at once, as the Veterinary Surgeon may be engaged on duty which he cannot leave, or is at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any service in an urgent case. Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the veterinary staff discredited. To obviate this, in all cases where veterinary advice and assistance are required, the owner should telegraph to "Veteran," Salisbury, with prepaid reply, the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible. This will enable the Chief Veterinary Surgeon to

telegraph advice at once and state whether he is able to arrange for veterinary attendance on the case or not, and save valuable time, which is always of importance in acute cases.

6. The services of Government Veterinary Surgeons will only be available for private work with the consent of such officers, and when such work does not interfere with their official duties, or when the services of a private practitioner are not available.

7. As the arrangement of allowing Government Veterinary Surgeons to attend to private cases is intended purely for the benefit of farmers and stock-owners who may wish to obtain professional advice, no responsibility whatever will be accepted for any loss of stock, etc., which may result from the negligent treatment or advice, or wilful default, of any Government Veterinary Surgeon.

8. All fees collected in terms of these Regulations are payable to the Treasury through the local Receiver of Revenue.

Sale of Dip

With a view to enabling farmers to obtain dipping material at as low a rate as possible arrangements have been made whereby orders may be placed with any officer of the Veterinary Department for the purchase of supplies of Messrs. W. Cooper & Nephew's cattle dipping fluid, adapted for three-day, five-day or less frequent dipping. The price of the dip is 48s. 6d. per 10 gallons, in not less quantities than that amount, delivered at any siding or station desired. Applications must be accompanied by remittances, without which they cannot receive attention. Remittances by cheque should be made in favour of Messrs. Meikle Bros., agents for the dipping fluid, commission being added, where necessary, to cover exchange. Coin or stamps will not be accepted. This dip is in use at all Government dipping tanks.

Sale of Virus

It is notified for public information that redwater and gall-sickness (*anaplasmosis*) virus may be obtained from the Veterinary Department, Salisbury, at a charge of ten shillings per dose.

Solutions of trypan blue and the injection used in the treatment of *trypanosomiasis* (fly disease) of cattle may also be obtained at a charge of five shillings per dose and blue tongue virus at one shilling and sixpence per dozen doses.

No material will be issued unless a remittance accompanies the order.

Irrigation

From the Agricultural Engineer assistance may be obtained by farmers for the following :—

1. In the locating of possible irrigation projects.
2. In the preparation of surveys or plans and for irrigation works, including weirs, dams, furrows, pumping plants, and determining the extent of land which may be brought under irrigation schemes, together with rough estimates of costs.
3. In the supervision of construction and carrying out of projects.
4. In the selection of suitable sites for boring operations.
5. Preparing specifications, etc., regarding pumping plants, windmills, and agricultural machinery.
6. Giving general advice on cognate subjects.

Informal advice of a general character will be given to applicants making enquiry by letter or in person. Any applicant desiring professional assistance likely to occupy more than one day should apply for advice in writing. All applicants should specify clearly the nature of the project on which they seek advice, and should give full particulars as to the distance and direction of their farms from some well-known centre. Applicants will be required to provide suitable means of transport for the officer concerned during the period devoted to work on the spot; to provide any unskilled labour that may be required; and to provide for any other contingent services. Applications should be addressed to the Director of Agriculture, who will endeavour to arrange visits as far as possible in order of application, but with due regard to situation, in order

to obviate unnecessary travelling and delay. The services of the Agricultural Engineer are given free, but in cases demanding prolonged individual attention, or repeated supervision, a charge may be made according to circumstances.

Samples

In connection with enquiries, especially with regard to diseases amongst crops, insect pests, soils, grain and the identification of plants, specimens should, wherever possible, be sent, together with full details. It is found that such parcels are often forwarded without any indication of where they are from or why they were sent and it is difficult in such cases to trace the sender. It is, therefore, requested that persons when forwarding samples for examination, indicate clearly their names and address on the package, so as to enable their requirements to be attended to without delay.

Charges for Dipping Cattle at Government Dipping Tanks.

On and after the 1st November, 1912, a charge of 1d. per head will be made in respect of all cattle dipped at Government dipping tanks.

Unweaned calves will be dipped free of charge.

Payment may be made in cash or by means of books of coupons at £1, 10/- and 2/6, which can be obtained from Civil Commissioners, Native Commissioners, or through all Veterinary Surgeons and Cattle Inspectors.

The tanks to which these provisions at present apply are the following :—

Salisbury (3), Bulawayo (3), Inyati, Umtali, Penhalonga, Melsetter, Marandellas, Macheke, Mazoe, Lomagundi, Hartley, Gwelo, Selukwe, Enkeldoorn, Victoria, Gwanda, Gatooma, Que Que, Umvuma, Kimberley Reefs.

Lectures for Farmers

The services of certain of the officers of the Department of Agriculture and the Veterinary Department are available for purposes of delivering lectures on subjects upon which they have special knowledge. As far as practicable, lectures will be accompanied by demonstrations at the time or subsequently in the field. Owing to the many calls on the time of the staff and the exigencies of their duties, alternative dates are desirable in order to avoid disappointment. The following topics are offered as examples of subjects that may be dealt with in this manner, but the suggestion of other themes is invited.

Agriculture.—Maize growing; Maize selection and maintenance of the breeding plot; Points of maize and maize judging, with demonstrations; Utilisation of granite vlei soils; Ground nut culture; Rotation crops for home use and for sale; Veld improvement by winter grasses; Production of foodstuffs for the mines; Ensilage; Fungoid diseases of maize and wheat; Wheat, oats and lucerne under irrigation; The prospects of cotton culture in Southern Rhodesia.

Veterinary Hygiene.—Detection and prevention of disease; The care of live stock.

Live Stock.—Judging of cattle according to breeds, and for beef, milk and draught; feeding and kraaling of live stock; general principles of cattle breeding; management of imported stock; grading up of native or local stock with pure bred bulls.

Dairying.—Home butter-making; building and equipment of a farm dairy; handling and marketing of milk; packing and marketing of butter; construction of cow houses.

Swine Husbandry.—Breeding and feeding of swine; some suggestions for the production of first-class bacon pigs; construction of piggeries at moderate cost.

Chemistry.—The principles of soil fertility; the principles of manuring; the value of lime in agriculture; chemistry of milk and its products (accompanied by demonstrations in milk-testing).

Entomology.—Economic entomology on the farm; the role of insects and their allies in the transmission of disease; scale insects and fruit trees and methods for their control; insect pests and maize; enemies of the potato, insect and fungus; the value and objects of plant import and nursery regulations.

Irrigation.—Methods of applying water to land for irrigation; the measurement of water in connection with irrigation; canal irrigation; storage reservoirs; hints on the selection of sites and on the design of earthen and other dams; irrigation by pumping, with notes on the selection of plants.

Enquiries and invitations should in the first instance be addressed to the Director of Agriculture, Salisbury.

Co-operative Experiments—Winter Cereal Crops

The free distribution of seed of winter cereal crops for trial under irrigation or on naturally moist land will commence about the end of February. The seed is issued free of charge on rail, Salisbury, and farmers taking part in the experiments are required to furnish, at the close of the growing season, on forms supplied for this purpose, an accurate and complete report on the result of the experiments. In the event of any applicant who has received seed failing to comply with these conditions his name will be removed from the list of those eligible to receive co-operative seeds in the future.

It is anticipated that the undermentioned varieties will be available for distribution, but since supplies of seed will be limited, early application is advisable, and no guarantee can be given that one particular variety asked for will be forthcoming. As far as possible applications will be dealt with in the order in which they are received. Not more than four varieties of seed in all can be supplied to each applicant.

Wheats	{	Early Gluyas
		Bobs
		Els
		Holstrooi
Oats	{	Algerian
		Garton's New Zealand
		Texas
		Smyrna
Barley	{	Sidonian
		Chevalier (malting)
Early Rye	{	Nepal (feed)

All applications to be addressed to the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, and full particulars to be given regarding the address to which it is desired seed should be consigned.

Departmental Bulletins

The following Bulletins, consisting of reprints of articles which have appeared in this Journal, are available for distribution free of charge to applicants in Rhodesia :—

AGRICULTURE.

- No. 2. The Possibilities of Rhodesia as a Citrus Growing Country, by R. McIlwaine, M.A., LL.B.
- No. 81. Possibilities of Export Trade in Oil Seeds, by H. Godfrey Mundy, F.L.S.
- No. 61. Requirements in sending Botanical Specimens to the Department for Identification.
- No. 71. Report of Forestry in Southern Rhodesia, by J. Sims, F.H.A.S.
- No. 78. Hints on Irrigation—Small Gravitation Schemes—Pipes and Pipe Laying—by W. Martin Watt, Government Agricultural Engineer.
- No. 68. Fertility of Soils and Organic Matter, by G. N. Blackshaw, B.Sc., F.C.S., Government Agricultural Chemist.
- No. 79. Winter Cereals, by H. Godfrey Mundy, F.L.S.
- No. 99. Bean Crops, by H. Godfrey Mundy, F.L.S.
- No. 125. Subterranean Water, by W. M. Watt.
- No. 137. Drainage for Irrigated and Swampy Land, by W. M. Watt.

CROPS.

- No. 55. How Maize can be made more profitable, by H. Godfrey Mundy, F.L.S.
- No. 115. Notes on Winter Cereals without Irrigation, by H. Godfrey Mundy, F.L.S., Government Agriculturist and Botanist.
- No. 76. Suggestions for Cotton Growers, by R. H. B. Dickson.
- No. 67. Maize Breeding and Seed Selection, by H. G. Mundy, F.L.S., Government Agriculturist and Botanist.
- No. 88. Chicory Growing, by H. Godfrey Mundy, F.L.S.
- No. 93. Soy Beans, by R. H. B. Dickson.
- No. 106. Cultivation and Preparation of Ginger.
- No. 107. The Cowpea, by R. H. B. Dickson.
- No. 116. Auxiliary Crops in Arable Farming.
- No. 126. Turkish Tobacco.
- No. 128. Paspalum, by J. A. T. Walters, B.A., Assistant Agriculturist and Botanist.
- No. 130. Notes on the Sowing of some Rhodesian Crops, by H. G. Mundy, F.L.S.
- No. 132. Sumatra Tobacco, Hints to Rhodesian Growers, by C. J. Sketchley.
- No. 133. Tobacco Culture (Virginia)—Planting, Cultivation, Fertilising, Priming, Topping, Suckering, Ripening.
- No. 136. Ensilage, by H. G. Mundy, F.L.S.
- No. 138. Tobacco Culture (Virginia)—Harvesting and Curing.

ENTOMOLOGY AND VEGETABLE PATHOLOGY.

- No. 58. Onion Thrips, by R. W. Jack, F.E.S.
- No. 12. The Tsetse Fly, by Ll. E. W. Bevan, M.R.C.V.S.
- No. 46. The Head Smut of Maize, by H. Godfrey Mundy, F.L.S.
- No. 89. Insect Friends of the Farmer, by R. W. Jack, F.E.S.
- No. 66. Selection of Spraying Outfit, by R. W. Jack, F.E.S.
- No. 69. Resin Wash and Means of Applying It, by R. W. Jack, F.E.S.
- No. 75. Fumigation of Fruit Trees with Hydrocyanic Acid Gas, by R. W. Jack, F.E.S.
- No. 100. Tsetse—Preliminary Notes on the Habits of—by R. W. Jack, F.E.S.
- No. 120. Some Insect Pests of Maize, by R. W. Jack, F.E.S.
- No. 139. Termites or "White Ants," by R. W. Jack, F.E.S.

VETERINARY.

- No. 14. Bots in Equines, by R. Ferguson Stirling, M.R.C.V.S.
 - No. 54. African Coast Fever, by Ll. E. W. Bevan, M.R.C.V.S. (revised edition).
 - No. 51. Strangles, by F. D. Ferguson, M.R.C.V.S.
 - No. 113. Anaplasmoses of Cattle, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 114. Anaplasmosis of Sheep, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 117. Ephemeral Fever or Three Days' Sickness in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 118. Preparation of Blood Smears.
 - No. 121. Rabies, by Ll. E. W. Bevan, M.R.C.V.S., and T. G. Millington, M.R.C.V.S., D.V.H.
 - No. 49. Notes on Bovine Plasmoses of Southern Rhodesia, with special reference to Mashonaland, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 50. Epizootic Abortion in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 103. Dipping and Tick-Destroying Agents, by Lt.-Col. H. Watkins-Pitchford.
 - No. 53. Animals Diseases Consolidation Ordinance, 1904.
 - No. 82. Difficult Parturition of the Cow, by C. R. Edmonds, M.R.C.V.S.
 - No. 91. Common Ailments of the Horse, by D. R. Chatterley, M.R.C.V.S.
 - No. 80. Detection and Prevention of Diseases of Stock, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 84. African Coast Fever—Diagnosis of Gland Puncture, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 95. Oestrus-ovis in Sheep, by Alec King.
- Conditions under which Government Veterinary Surgeons' Services are available to the public.

MISCELLANEOUS.

Terms for Analysis by the Department of Agriculture, of Produce, Soils, Water, etc.

- No. 108. Lime Deposits in Rhodesia and their Value, by G. N. Blackshaw, B.Sc., F.C.S.
- No. 111. Special Railway Rates for the Benefit of the Farming Community.
- No. 83. Hints on Brickmaking, by G. S. Dyke.

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- No. 62. Services of Agricultural Engineer.
- No. 77. Animals Diseases Amending Ordinance, 1911.
- No. 90. Reports on Experiments—Experimental Station, Salisbury, 1910-1911, by J. H. Hampton.
- No. 10. Watering and Feeding of Live Stock on Railway.
- No. 93. Formation of Agricultural Credit Associations in Rhodesia, by Loudon M. Douglas, F.R.S.E.
- No. 96. Swine Breeds and Breeding of, by Loudon M. Douglas, F.R.S.E.
- No. 98. Pig Breeding and Feeding, by T. M. Rixon.
- No. 104. Stock Raising, by Otto Zimmerman.
- No. 105. Bacon Curing on the Farm, by Loudon M. Douglas, F.R.S.E.
Dipping Tanks—Grants in Aid.
Forestry—Sale of Seedling Trees.
- No. 110. Utility Poultry Keeping, for Amateurs and Beginners, by "Gallinule."
- No. 119. Some Notes on Charcoal Burning, by Eric A. Nobbs, Ph.D., B.Sc.
- No. 122. Notes on the Management of Dairy Herds, by R. C. Simmons.
- No. 123. Feeding and Care of Imported Bulls, by R. C. Simmons.
- No. 124. The Manuring of Maize on the Government Experiment Farm, Gwebi, 1912.
- No. 127. Notes on the Building of Farm Homesteads, by R. C. Simmons.
- No. 129. How to Make Use of the "Fencing Ordinance, 1904," by N. H. Chataway.
Health and Clothing.
Malaria: its History, Prevention and Cure, by A. M. Fleming, C.M.G., M.B., F.R.C.S. (Ed.), D.P.H. (Camb.), Medical Director.
- No. 131. Notes on Cattle Breeding, Part I. The Shorthorn, by R. C. Simmons.
- No. 134. Plans and Specifications for Flue Curing Tobacco Barns.
Game Law: Summary of.

Employment on Farms.

The Department of Agriculture receives numerous enquiries from persons of varied attainments, age and financial position for openings on farms, as managers, assistants and learners, requiring remuneration on corresponding scales, or willing to give services in return for keep.

In order that work may be found for the above and needs of farmers met, applications are invited from both employers and persons seeking employment. Applications are also invited from artisans, such as masons, bricklayers, carpenters, fencers, well sinkers, concrete workers, and the like who may desire work on farms. In cases where employers have obtained the labour they require, or applicants for employment have found work, it is requested that notification be at once sent to the Department of Agriculture, in order that unnecessary correspondence be avoided.

Replies to the following applications should be addressed to the initials of the advertisers, c/o Director of Agriculture, who will forward the letter to the party referred to.

SITUATIONS VACANT.

C. C. T.—Tobacco grower, experienced in growing and curing (open air) tobacco. Employer supplies land properly worked, implements, etc., on half shares.

F. A. W. has vacancy for farming pupil, who must pay for board.

H. E. H.—Farm pupil. Board and lodging supplied.

J. H.—One or two men to assist during tobacco-curing season. £2 a month; board and lodging.

H. W. N.—Assistant during tobacco-curing season. Must have had previous experience.

J. J. R.—Assistant for tobacco growing and curing.

W. M. W.—Partner with a little capital to develop farm situated in Figtree district. Terms to be mutually arranged.

SITUATIONS WANTED.

J. J. R. and R. W. F.—Understand farming in all its branches; long experience. Prepared to work on shares.

S. P. L.—General knowledge of farming in all branches. Six years' farming in Melsetter district, agricultural and stock. Married; no children.

J. E.—As manager or assistant. A little Home experience.

J. B.—Would like to work on shares. Seven years' experience of general farming in Cape Province.

H. B.—As farm manager. Trained at Elsenberg Agricultural College; experience in stock and dairy management, sheep, horses and cattle.

G. B.—Would like to work on shares. Four years' experience of general farming in Colesberg district, Cape Colony.

J. M.—Knowledge of stock; considerable experience with cattle in Australia.

G. L.—Assistant on farm. One year farming in Transvaal. Brought up on farm in Cape Province. Wages £3 to £5 per month, with board and lodging.

K. S.—Wishes to obtain experience on general or tobacco farm.

J. B. H.—Requires employment on tobacco farm.

J. G.—Understands horses, cattle and agriculture. Married; wife understands poultry. Would like to get on farm where he can also cultivate and keep stock for himself.

E. D. P.—Tobacco growing. One year's experience. £3 per month, and board.

P. W. P. and J. J. R.—Services in return for small salary or interest in farm. Thorough knowledge of farming in Cape Province and Free State.

B. O. M.—Would like to get on tobacco farm to gain experience.

C. J. S.—Twenty-five years of age. Six years' farming experience in Cape Province. Would like to work a farm on percentage of profits.

P. M. W.—Prefers dairy farming; wife understands butter making and poultry. Recommended by Chairman, O.F.S. Land Settlement.

A. E. B.—Three years' experience in mixed farming in Rhodesia. Requires position as assistant on mixed farm or ranch.

P. S. B.—Experienced in general farming, including vegetable and tobacco growing. Married; wife can make butter and accustomed to farm life.

C. F.—Experienced in general farming, including tobacco; capable of managing a farm. Married, one child.

L. G.—Understands general farming; would like employment as manager on ranch.

H. F. L.—No experience. Board and lodging in return for services.

S. O. M.—Employment on tobacco farm. Experienced in dealing with natives.

N. M.—Practical farming experience in Devonshire, and ten months in Rhodesia; age 26.

W. M.—Requires employment as manager of cattle ranch or mixed farm. Twelve years' experience in South Africa. Age 35; single.

J. O. W.—Colonial farmer; 25 years' experience general farming.

H. S. D.—Graduate Hawkesbury Agricultural College, New South Wales. Served under Natal Government as orchardist and forester.

B. E.—As land surveyor or farm manager. Experience in latter in Norway. Graduated in agriculture at university in Norway.

C. H.—Twelve months' general farming experience in Rhodesia. Like to go in on share principle. Will work for board and lodging if chance given to learn tobacco growing.

R. C. M.—Competent tobacco grower wishes position as manager, or would be willing to go in on shares for work done.

L. I. P.—Twelve months' experience at farming in Rhodesia. Wages £3 to £5 a month, with board and lodging.

N. P.—Experienced in general farming. Small salary, with board and lodging.

E. S.—To start with, prepared to work for board and lodging.

W. F. C. W.—Prepared to go on farm as pupil, and give services in return for board and lodging.

K. A. K. S.—Understands tobacco growing, and has knowledge of general farming. Has small capital, and prepared to go in on share principle.

G. A. M.—Nine years' experience at farming in Rhodesia. Thorough knowledge of buildings, tanks, etc.; would like management of a stud farm.

N. E. P.—Experience with stock on East Coast. Would like employment on tobacco and general farm.

Government Notices.

ANIMALS DISEASES AMENDING ORDINANCE, 1911.

Ordinance No. 2, 1911.]

[Promulgated 17th March, 1911.

BE IT ENACTED by the Administrator of Southern Rhodesia, with the advice and consent of the Legislative Council thereof, as follows:—

1. So much of the "Animals Diseases Consolidation Ordinance, 1904" (hereinafter referred to as the said Ordinance) and of any other law as may be repugnant to or inconsistent with the provisions of this Ordinance is hereby repealed.

2. The Administrator may, on the outbreak of a destructive disease, or when there is suspicion of the existence of such disease, declare an area around and including the place where such disease exists, or is supposed to exist, actively infected for the purpose of this Ordinance.

3. Whenever an area shall have been declared infected in terms of the last preceding section, the Administrator may, for the purpose of suppressing or controlling disease, cause such fences to be erected along the boundaries of or across any farms or land situated in such area as he may deem necessary.

4. (1) If the landowner shall not pay the cost of erecting any fence as aforesaid upon completion thereof, the cost shall be defrayed in the first instance out of moneys provided by the Legislative Council.
- (2) When any fence erected as aforesaid runs along the boundary of a farm, the cost of the erection of such fence shall, if not sooner repaid, be repaid, together with interest at the rate of £5 per centum per annum, by equal yearly instalments commencing two years after the fencing is completed, such instalments being so calculated and fixed that the said cost and interest shall be wholly repaid within a period of fifteen years from the date when the first instalment became due.
- (3) Such repayment shall be made by the adjoining landowners whose land has been divided by the fence. Each such landowner shall pay one-half the cost of the dividing fence and interest as aforesaid. When the adjoining land is a native reserve, or a portion of such reserve, the one-half of the cost shall be paid from funds in the local Treasury of the British South Africa Company.
- (4) When any fence as aforesaid shall be erected within, and not on and along, the boundaries of any farm, the cost shall be paid from the funds of the local Treasury of the British South Africa Company, and the fence when no longer necessary for the purpose for which it was erected may be removed by the British South Africa Company; provided that the landowner shall have the right to purchase such internal fence at a price representing the total cost of such fence.
- (5) The term "owner" shall mean (a) the person registered as such in the office of the Registrar of Deeds, (b) the British South Africa Company in respect of native reserves, and (c) the local authority in respect of municipalities.

5. Where the bed of a stream or river lies immediately between or constitutes the boundaries of land owned by private owners, the fence may be erected on one or other bank of the river or stream and across it, or partly

on one bank, across it, and partly on the other bank, in such manner as may be agreed upon by the owners whose lands are separated by the said stream or river. The Administrator may call upon the said owners to agree to the position of the said fence on or before a date fixed by him, and, should they fail to do so, he may cause such fence to be erected without further reference to the said owners. For the purposes of repayment, such fence shall be considered as dividing the lands of adjoining owners, and half the cost shall be recoverable from each owner whose lands are separated by the said stream or river.

6. The Administrator may call upon any owner whose land has been fenced in terms of section 3 or 12 to provide sufficient security for the payment of any sums that may be due to the British South Africa Company in its local Treasury in respect of such fence. If the owner shall fail or refuse to provide such security, the Administrator may cause a notice in writing to be sent to the Registrar of Deeds of the amount due by such owner, and the Registrar shall make an entry thereof in respect of the land fenced. Such entry shall constitute an hypothecation of the land, ranking from the date on which the entry was made and for the amount therein stated; provided that the Registrar may pass transfer of land so hypothecated if the transferee agrees in writing that any sums due and unpaid shall remain and be registered as a charge against the said land.

7. When any land held under lease or permit of occupation has been fenced in terms of this Ordinance, during the term of such lease or permit the lessee or permit holder shall pay to the proprietor of such land yearly, during the continuance of the lease or permit of occupation, interest at the rate of £5 per centum upon so much of the cost of the fence as the proprietor is liable for, and such payment shall be made with the rent of the land, and shall be deemed in law to be part of such rent.

8. Any tenant or holder of land under a permit of occupation having a right to purchase such land at a fixed price shall, on completion of the purchase, pay to the proprietor, in augmentation and as part of the purchase money, any sum paid by such proprietor for the fencing of such land, and shall become and be liable to repay to the British South Africa Company in its local Treasury such sums as remain unpaid, as the same become due and payable in terms of this Ordinance.

9. Where in the case of any local authority the title to land provides that upon the sale thereof the British South Africa Company shall be entitled to receive a proportion of the purchase price, the local authority shall be entitled to deduct from the purchase price of land sold any debt due or amount paid by it in respect of fences on the land so sold erected under this Ordinance.

10. The provisions of sections 14 and 15 of the "Fencing Ordinance, 1904," in regard to repairs shall, *mutatis mutandis*, apply to fences erected in terms of this Ordinance.

11. Where a fence crosses any road used as of right by the public or by any neighbouring landowner, a properly constructed swing gate shall be placed at the point of crossing.

12. Any person opening such gate, except for the purpose of passing through, or omitting to close such gate after having passed through, and any person damaging such gate and omitting to immediately repair such damage shall be liable to a fine not exceeding £10, or in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

13. The Administrator may, for the purpose of the more effective prevention or control of disease, apply the provisions of this Ordinance in respect of fencing to municipalities and townships and such land adjoining as may be deemed expedient, and to places within a radius of ten miles of an area declared actively infected in terms of section 2 hereof, if, owing to the number of cattle in such places, or other causes, it appears expedient.

14. (1) The owner or proprietor of the land along the boundaries of which fences have already been erected by the British South Africa Company for the purpose of preventing the spread of

African Coast Fever in cattle shall be and is liable to repay to the British South Africa Company in its local Treasury one-half of the cost of so much of the fence as may be along the boundary of such land. The provisions of sections 7 and 8 of this Ordinance shall apply in the case of land held under lease or permit of occupation along the boundaries of which fences have already been erected. The British South Africa Company may remove any such fence already erected which is within and not on or along the boundaries of any land when no longer necessary for the purposes for which it was erected.

- (2) Any payment due in respect of any such fence may be made as provided by section 4 of this Ordinance, and under the like conditions as to security for such payment as are prescribed under section 6.

15. Within any area declared by the Administrator to be actively infected under the provisions of section 2, or to which the provisions of this Ordinance shall have been applied in terms of section 12, the Administrator may for the purpose of more effectively preventing the spread of disease cause to be constructed on any land a dipping tank and any structures incidental thereto or other appliances for the dipping of stock, and may recover the expenditure incurred from the owner of the land on which such tank, structures or appliances have been constructed. The cost of such tank, structures or appliances shall be paid on the same terms and under the same conditions as are applicable to boundary fences under sections 4, 6, 7 and 8 of this Ordinance.

16. In addition to any penalties that may be imposed under the said Ordinance or any amendment thereof, or under any regulations framed thereunder for the unlawful movement of cattle, the Court of the Magistrate before which the case is tried or the High Court in the like instance may direct the confiscation of any cattle unlawfully removed, and such cattle, if infected with disease or likely to convey infection, shall be destroyed without compensation. Should there be no danger of infection the Administrator may order such cattle to be temporarily kept at any spot denoted by him and then sold. The proceeds of any such sale shall be paid to the British South Africa Company in its local Treasury.

17. Section 11, sub-section (1) of the said Ordinance is hereby repealed, and in lieu thereof the following shall be the section :—

“Should any Inspector, Sub-Inspector or any person specially authorised by the Administrator to carry out the provisions of this Ordinance know or suspect that any animal is infected with any destructive disease such Inspector, Sub-Inspector or other authorised person may forthwith place such animal in quarantine, together with such land as is necessary for its isolation, and such animals as have been or are suspected of having been in contact with such animal or with infection. Notice of such quarantine shall be given in writing to the owner or custodian of such animal and to the Magistrate of the district, and shall remain in force for such time as the Chief Inspector or Controller of Stock may direct, unless the Administrator shall sooner, if he thinks fit, issue the notice referred to in sub-section (2) of section 5. A copy of the notice of any such quarantine shall be posted at the office of the Magistrate, and shall be inserted by the Magistrate in some newspaper, if any, circulating in the district.”

18. Section 16 of the said Ordinance is hereby repealed, and in lieu thereof the following shall be the section :—

“Any Government Veterinary Surgeon or any person thereto authorised by the Controller of Stock, Chief Inspector or by a Magistrate may enter any land, building, kraal or enclosure for the purpose of inspecting animals. Should any animal be found to be infected with any destructive disease, or should such infection be reasonably suspected, he may quarantine such animals as in this

Ordinance provided, and may order the proper disinfection of any building, kraal or enclosure in which such animal is or may recently have been, and the furniture and fittings thereof. Should it be impossible to properly disinfect such stable, kraal or enclosure, furniture or fittings in any of them, he may order the destruction thereof; provided that no building, kraal or enclosure shall be destroyed unless the owner consents thereto in writing, or failing such consent, the Administrator orders that such destruction be carried out."

19. Section 22, sub-section (1) of the said Ordinance is hereby amended by the addition of the following words after the word "obtained" in the twelfth line of the said sub-section, "and any person receiving or taking delivery of any animals without having ascertained that such permit has been obtained."

20. This Ordinance may be cited as the "Animals Diseases Amending Ordinance, 1911," and shall be read as one with the "Animals Diseases Consolidation Ordinance, 1904," and the "Animals Diseases Amendment Ordinance, 1910."

No. 216 of 1912.]

[4th July, 1912.]

REMOVAL OF CATTLE TO PRESCRIBED AREAS.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that, notwithstanding the provisions of Government Notices Nos. 47 and 254 of 1910 and 51 of 1911 the removal of cattle to any point within twenty miles of the border of the territory defined by the Crocodile, Shashi and Ramaquabane Rivers, to the south-east beacon of Mphoeng's extension on the last named, may be allowed until further notice under permit from the Chief Inspector for the purposes of grazing and watering.

No. 64 of 1913.]

[20th February, 1913.]

ANIMALS DISEASES CONSOLIDATION ORDINANCE, 1904.

WHEREAS it is necessary to afford facilities for transport with cattle between the Iron Mine Hill Siding area and the Umvuma Siding area as described in the Schedule to Government Notice No. 11 of 1912, I, under and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," notwithstanding any regulations to the contrary, declare that the above-mentioned areas shall be regarded as one for the purposes of working draught cattle for a period of three months from 21st February, 1913.

No. 50 of 1912.]

[8th February, 1912.]

AFRICAN COAST FEVER.

Regulations regarding the movement of cattle and the prevention and suppression of disease.

1. UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notices Nos. 329 of 1910 and 308 of 1911 and make the following provisions in lieu thereof:—

2. The various districts of Southern Rhodesia are hereby declared an area infected with African Coast Fever for the purposes of section 5 (2) of the aforesaid Ordinance, and, save as hereinafter set out, all movement of cattle within the said districts is prohibited until further notice.

General Movement.

3. For the purpose of section 22 (1) of the said Ordinance, the following shall be regarded as places within the boundaries of which the movement of cattle may be allowed without special permission:—

- (a) Single farm.
- (b) Two or more adjoining farms, farmed together under one management and situated within one cattle transport area.
- (c) An area, the property of one owner, enclosed by a substantial fence.
- (d) For grazing purposes, an area within a radius of four miles of native kraals situated on unalienated land or in reserves, save and in so far as such area includes any private land.

The sites of such kraals shall be deemed to be the places where they are situated at the date of promulgation of these regulations.

4. Notwithstanding the provisions of the last preceding section, or of section 9 hereof, the Chief Inspector may, on the outbreak of disease, or for such other cause as may be deemed expedient, direct the isolation or quarantine of cattle on a limited area of the aforesaid places.

5. The movement of cattle from place to place may be permitted under the special permission, in writing, of an Inspector, Sub-Inspector, or other officer or person duly authorised by the Administrator to grant such permission.

6. No permission as aforesaid shall permit the movement of cattle—

- (a) Without the written consent of the owners, occupiers or managers of occupied land, and in the case of native reserves, of the Native Commissioner of the district over which land or reserve such cattle will pass, whether along roads or otherwise; provided, however, that refusal to grant such consent shall be in writing, and provided further that if the Controller of Stock or the Chief Inspector shall consider that such consent is withheld without good and sufficient cause he may permit of movement without such consent.

If any such person mentioned above refuse to give consent or to state a reason for refusing to do so in writing, no valid objection shall be deemed to exist and movement may be permitted without such written consent.

- (b) Within a veterinary district as defined in the Schedule annexed hereto from one transport area to or through another without the consent of the Cattle Inspector in charge of such area.
- (c) From any veterinary district to or through another without the consent of the District Veterinary Surgeon of such district.

Slaughter Cattle.

7. Cattle moved to any centre for slaughter under the provisions of these or any other regulations shall, on arrival, be immediately taken to such quarantine area (if any) as is provided for the purpose and immediately branded with the letters "V.D." on the near hip.

8. Cattle admitted to a quarantine area in terms of the last preceding section shall be slaughtered within twenty-one days of the date of admission, and shall not be permitted to leave the same except for the purpose of being slaughtered at the appointed abattoir, and if found outside such area, except for the said purpose, may be destroyed on the order of the Chief Inspector or Controller of Stock; provided, however, that the Chief Inspector may allow the removal of cattle from such an area under such conditions as he may prescribe.

Transport Cattle.

9. The use of cattle for draught purposes is prohibited except:—

- (1) Within the boundaries of the places defined in section 3 (a), (b) and (c) hereof.

- (2) Within the boundaries of areas already fixed for the use of cattle for draught purposes in terms of regulations published under Government Notice No. 329 of 1910, or such other areas as may be fixed by the Administrator.

10. Notwithstanding the provisions of section 9, no permit shall authorise the working of cattle

- (a) which are not clearly and distinctly branded with the registered brand of the owner;
- (b) in any wagon or vehicle which shall not have the owner's name and address legibly and permanently inscribed on the right side thereof.

11. No wagon or other vehicle drawn by oxen shall be moved from one cattle transport area into another without the permission of the Cattle Inspectors concerned, and under such conditions as they may impose.

General Provisions.

12. On the outbreak or suspected outbreak of disease, the Administrator may declare an area of infection around and embracing the place of outbreak or suspected outbreak, and a further area or areas around such area of infection as a guard area, whereupon all movement of cattle into and from place to place within such area or areas shall be immediately suspended, except as hereinafter provided.

A.—In areas of infection and guard areas:—

- (1) Cattle in transit by rail may be moved through such area.
- (2) Cattle from beyond the borders of Southern Rhodesia may be detained within such area or areas *en route* to destination.
- (3) Cattle for *bona fide* farming, dairy and slaughter purposes may be moved into such area or areas by permission of the Chief Inspector and under such conditions as he may impose.

B.—In guard areas only:—

Cattle may be moved into and from place to place within such area under the conditions of section 6 hereof.

13. The removal of green forage, hay, fodder, bedding reeds, manure or of such other articles as may be reasonably supposed capable of conveying infection, shall be prohibited from areas of infection, save and except with the special permission of the Administrator.

14. Whenever an area shall have been declared under section 12 hereof, every person within such area, or within such further area as may be specified by Government Notice, owning or in charge of cattle shall, upon the death or slaughter because of disease, suspected disease, or accident, of any such cattle, immediately report such occurrence through the nearest Cattle Inspector, Native Commissioner or Police Officer to the District Veterinary Surgeon.

15. Notwithstanding the provisions of these regulations, it shall be competent for the Chief Inspector of Cattle to authorise and direct the movement of cattle for the purposes of isolating, dipping, quarantine, or any other such objects as may be deemed necessary to prevent or suppress an outbreak of disease.

16. Whenever an area shall have been declared an area of infection or guard area in terms of section 12 hereof, any person who shall allow any cattle to stray or be otherwise removed, except as provided for in these regulations, from any one place within such area to another place, or from a place outside of to a place within such area, shall be guilty of an offence against these regulations.

17. All cattle within the limits of the various commonages and townlands, areas of infection and guard areas as declared under section 12 hereof, or depastured on common grazing ground, shall be dipped or sprayed at least

once in every three days, unless the Chief Inspector shall authorise the extension of the time between such dipping or spraying, or the entire suspension of the same.

18. In all areas of infection and guard areas sheep and goats shall be dipped at such periods as may be directed by the Chief Inspector.

19. Whenever the owner, occupier, or manager of a farm shall adopt means of cleansing cattle running thereon, either by spraying, dipping, or by any other method, the Chief Inspector may order any natives or other persons having cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district within which the farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

20. All permits for the removal of cattle issued under the provisions of the said Ordinance or of any regulations framed thereunder shall specify legibly and clearly on the face thereof the place from and to which such cattle may be removed, the route by which they shall travel, the number and brands of such cattle, the time allowed for the journey, and such other particulars and conditions as it may be deemed expedient to provide.

21. No permit issued for the movement of cattle shall be taken to authorise any trespass in connection with such movement.

22. Notwithstanding the provisions of these regulations, it shall not be lawful for any owner of cattle to allow any such cattle to be on any road, public outspan, commonage, or any property other than that of the owner, unless they are free from ticks or unless they have been effectively cleansed by dipping, spraying or other process, within fourteen days of being allowed on such road or other place. Any beast having ten or more ticks on it shall not be considered free from ticks.

23. Any person contravening the provisions of these regulations or the conditions set out in permits issued thereunder, shall, where no higher penalty has been by the said Ordinance or any other law provided, be liable in respect of each offence to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months.

SCHEDULE "A."

VETERINARY DISTRICTS OF SOUTHERN RHODESIA.

(1) *Salisbury.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912:—

32. Battlefields; 33. Hartley and Gatooma; 34. Gadzenia Station; 35. Makwiro Station; 36. Norton Siding; 37. Hunyani Tank; 38. 1645½ Peg B. & M. & R. Railways; 39. Salisbury A.; 40. Salisbury B.; 41. Salisbury C.; 42. Salisbury D.; 43. Arcturus; 44. Bromley; 45. Marandellas North; 46. Marandellas South; 48. Headlands Station; 49. Junction Mazoe and Lomagundi Railways; 50. 23-Mile Peg, Lomagundi Railway; 51. Passaford Station; 52. 35-Mile Peg, Lomagundi Railway; 53. Gwibi Tank Halt; 54. Banket, Lomagundi; 55. Eldorado, Lomagundi; 56. Selby Siding; 57. Mazoe; and 58. Kimberley Reefs.

(2) *Bulawayo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912:—

1. Plumtree; 2. Marula Siding; 3. Figtree; 4. Westacre Junction; 5. Bulawayo Area; 6. Heaney Junction; 7. Bembesi Station; 8. Insiza North; 9. Insiza South; 10. Shangani North; 11. Shangani South; 14. Redbank; 15. Nyamandhlovu Station; 16.

Malindi Station; 17. Wankies Area; 18. Matetsi Siding; 19. Matopo Terminus; 20. Sabiwa Siding; 21. Gwanda Station; 22. West Nicholson; 23. Belingwe; 59. Essexvale and Balla Balla Areas; 60. Stanmore Siding Area; 61. Filabusi Area.

(3) *Gwelo*.

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912:—

12. Somabula Siding; 13. Gwelo Station; 24. Selukwe Area; 25. Surprise Area; 26. Indiva Siding; 27. Lalapanzi; 28. Iron Mine Hill Siding; 29. Umvuma Siding; 31. Que Que Station.

(4) *Umtali*.

An area comprising the native districts of Umtali, Melsetter, Makoni and Inyanga.

No. 189 of 1912.]

[6th June, 1912.

REMOVAL OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that, notwithstanding the provisions of section 12 of Government Notice No. 50 of 1912, the removal of cattle for purpose of obtaining food or water may be permitted at the discretion of the Chief Inspector, and under such conditions as he may prescribe.

No. 175 of 1912.]

[30th May, 1912.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that, notwithstanding the provisions of Government Notices Nos. 47 and 254 of 1910 (and 51 of 1911), the removal of cattle to within that portion of the prescribed areas westward of the Salt River, Tuli district, may be allowed under permit from the Chief Inspector, for the purposes of grazing and watering.

No. 233 of 1912.]

[11th July, 1912.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notice No. 127 of 1910, in so far as it relates to the Protectorate of Nyasaland, and further do hereby prohibit the introduction into Southern Rhodesia of cattle from Nyasaland until further notice.

No. 252 of 1912.]

[1st August, 1912.

AFRICAN COAST FEVER. TRANSPORT AREAS.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 9 of the regulations published under Government Notice No. 50 of 1912, declare the areas described in the subjoined Schedule as areas within which the use of cattle for draught purposes may be permitted.

SCHEDULE.

62. *Mazi Siding*.

An area including the farms Cheronga, Highfield, Kirbyvale, Mona, Dyffryn, Maidstone, Harrisonville, Recondite and Crofton.

63. Inyazura Siding.

An area bounded by and including the following farms:—Inyamapamberi Outspan, Tiny, Marngu, Mount Zonga Commonage, Mount Zonga, Kwapassi Outspan, Orowati, Tableview, Tsungwesi Source, Tsungwesi Ridge, Everton, and the unsurveyed land lying east of a line drawn from the north-west beacon of Everton to the south-west beacon of Tiny.

64. Igusi Siding.

An area bounded by and including the following:—Winter, Spring, Eland, Buda Block No. 2, Grant, Batley, Groote Schuur No. 2, Frankland, Fry's Farm, Goshen Flat, Uhlanulu, Ubusiga, Ughwindhla, Ihlobo, Woodlands, Teakdale, Barn Park, Forest Hill, Groote Schuur, Majindan, Mvuba, Barwon, Campaspe, Esperanza, Merryland and Maraposa.

65. Gwaai Area.

An area bounded by the Malinda area, the Bechuanaland border, the Plumtree, Nyamandhlovu, Igusi Siding, Bembesi, Shangani North and Gwelo areas, from the most northerly point of the latter down the Shangani River to the western boundary of the Shangani Reserve, thence in a southerly direction along the same to the Gwampa River and down this river to the Malinda area.

No. 12 of 1913.]

[9th January, 1913.]

AFRICAN COAST FEVER.

WHEREAS there has been an outbreak of a destructive disease, to wit, African Coast Fever, on the farm The Grange, I, under and by virtue of the powers vested in me by the "Animals Diseases Amending Ordinance, 1911," do hereby declare the said farm and the following surrounding farms in the native district of Salisbury to be an area actively infected with African Coast Fever for the purposes of the said Ordinance:—

Teviotdale, Vainona, Pomona, Borrowdale, Glen Lorne, Springs, Stuhm, Chishawasha, Sternblick, Gletwyn, Rietfontein, Chikurubi, Manresa, Father Hartmanns, Gardiner, Caledonia, Sebastopol, Dispute, Donnybrook, Waterworks Reserve, Green Grove, Letombo Camp, Greendale.

No. 82 of 1913.]

[13th March, 1913.]

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notices Nos. 338 of 1912 and 13 of 1913, and, in terms of section 12 of Government Notice No. 50 of 1912, declare the following areas of infection and guard areas for the purposes of the said Ordinance:—

(1) NATIVE DISTRICTS OF UMZINGWANE, BULAWAYO, MATOBO AND BUEB.

(a) *Areas of Infection.*

The farms Alnwick, Nyorka, Induba, Collaton, Irene, Maboqutwaneni Outspan, the portion of the Essexvale Estate known as the North Paddock, which adjoins the farm Ballarat on its eastern boundary, and the fenced subdivision of Bulawayo Commonage, which includes the township, suburbs and Hillside.

(b) *Guard Area.*

An area bounded by and including the following farms: Lochard Block, Half Ration Ranche, Chilton, Fincham's, Inyati Reserve, Huntsman, Robert Block, Induna, Waterfall, Dingaan, Rouxdale, Fundisi, Helenvale.

(excluding farms Nos. 1, 3 and 16), Slight's, Bilars, Stonycroft, Craiglee, Blewbonny, Ireland, Welcome, Springvale, Vriegezicht, Paul's Rest, McGeer's Luck, Centenary Mission, Outspan No. 3, Anglesea, Mineral King, World's View, Matopo Block, Mission Farm, Brethren in Christ, Absent, that portion of the Matopos lying north of a line drawn from the south-eastern beacon of Absent to the north-western beacon of Longfield, The Range, Clarke's, Swaithe's, Limerick, Pioneer's Rest, Hayhill, Reitfontein, Bradford, Hamilton, Mayfair, York, Indiana, Rathline, Westondale, Sub-division A, Fochabers, Kodhwayo, Zimbili and Lochard Outspan.

(2) NATIVE DISTRICT OF SALISBURY.

(a) *Areas of Infection.*

Salisbury Commonage, the southern portion of the farm The Grange.

(b) *Guard Area.*

The farms Reitfontein, the northern portion of The Grange, Gletwyn, Sternblick, Chikurubi, Greendale and Nursery.

(3) NATIVE DISTRICT OF UMTALI.

(a) *Area of Infection.*

Umtali Commonage.

(b) *Guard Area.*

The farms Devonshire, Quagga's Hoek, Fern Valley and Fern Hill.

No. 342 of 1912.]

[24th October, 1912.

TRANSPORT AREAS.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 9 of the Regulations published under Government Notice No. 50 of 1912, declare that, until further notice, the main road between the Tokwe and Ngesi Rivers is included in Area No. 24, Government Notice No. 11 of 1912, and the use of cattle for draught purposes is therefore permitted up to the Ngesi River upon the said road.

No. 392 of 1912.]

[19th December, 1912.

TRANSPORT AREAS.

WHEREAS it is desirable to afford facilities for a limited amount of transport with cattle from Shangani Station to the Native Commissioner's Office in the Belingwe district, I, under and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," do hereby, notwithstanding any regulations to the contrary, authorise the Chief Inspector to permit of such transport under such terms and conditions in writing as to him may seem fit.

No. 22 of 1913.]

[16th January, 1913.

MOVEMENT OF CATTLE.

IT is hereby notified for general information that, in terms of section 5 of the regulations published under Government Notice No. 50 of 1912, I do hereby authorise Native Commissioners and Assistant Native Commissioners to issue permits for the movement of cattle from place to place, in conformity with the provisions of the said regulations.

SUMMARY OF THE "GAME LAW CONSOLIDATION ORDINANCE, 1906," AND REGULATIONS ISSUED THEREUNDER.

The Ordinance divides the game into three distinct classes, described as follows :—

- (a) Birds and Small Buck.
- (b) Bushbuck, Hartebeest, Impala, Lechwe, Pookoo, Roan and Sable Antelope, Sitatunga, Tsessebe, Waterbuck, and Wildebeest.
- (c) Royal Game, which includes Eland, Elephant, Giraffe, Gemsbok, Hippopotamus, Inyala, Koodoo, Ostrich, Rhinoceros, Springbuck and Zebra.

The shooting season for Class "A" is as follows :—

In Mashonaland :

Birds from 1st May to 30th September.

Small Buck from 1st May to 31st October.

In Matabeleland :

Birds and Small Buck from 1st May to 31st October.

To shoot in Class "A" a licence costing £1 per annum is required. This entitles holders to hunt in both Provinces during the open season.

Class "B."—The season opens on 1st July and closes on 30th November in both Provinces. The licence fee is £25 for non-residents and £5 for persons having their domicile in Southern Rhodesia. This licence entitles the holder to shoot up to 15 head, which number may be increased to a total of 25 upon payment of a further sum of £15 in the one case and £5 in the other.

Class "C."—The Administrator may, if he is satisfied that the animals are actually required for scientific purposes, grant to the holder of a game licence permission to shoot or capture any of the species included in this Class. Such permit requires a £5 stamp. Applications in writing, together with proof of *bona-fides*, should be addressed to the Director of Agriculture.

Game for Farming Purposes.—Permits are granted for the capture of Eland, Ostrich, Zebra or other animals for the purposes of breeding or farming. Such permits require a stamp of the value of £1 and remain in force for six months. Application, accompanied by a sworn declaration, should be made through the Director of Agriculture or the Civil Commissioner of the district.

Game Injuring Crops.—The occupier of any cultivated land or any person acting under the authority of such occupier, may at any time destroy game actually doing damage on such land.

Elephants on Occupied Farms, Melsetter.—The destruction of Elephants when found on occupied farms on the High Veld in Melsetter District is authorised (*vide* Government Notice No. 284 of 1908).

Tsetse Fly, Hartley District.—Government Notice No. 201 of 1912 withdraws the Close Season for Class "B" until 30th June, 1913, in the area in the Hartley district bounded as follows :—From the Railway bridge on the Umfuli River, thence north-westwards along the Umfuli River to where it joins the Umniati River, thence southwards along the Umniati River to where it joins the Umsweswe River, thence eastwards along the Umsweswe River up to the drift at the Lydia Mine, thence along the old road from Lydia Mine to Etna Mine and to Inez Mine, thence northwards along the road from Inez Mine to Hartley, thence in the direction of the Railway bridge to the starting point on the Umfuli River. This notice also transfers from Class "C" to Class "B" Eland, Koodoo, and Zebra so far as that area is concerned. Under Government Notice No. 129 of 1909 game in Class "B" may be shot without a licence in this area.

Game in Class "A" may be hunted in the close season until further notice on private land in the Melsetter district by holders of a licence.

Protected Areas.—No game may be hunted or killed within the limits of the Commonage or Townlands of Bulawayo and within a radius of two miles of the Court House, Gwelo, or within the Urungwe Game Sanctuary, as defined by Government Notice No. 237 of 1906.

"Locust Birds" are strictly protected, *vide* Government Notice No. 121 of 1907.

Export of Game.—No living Game or the Eggs of any Game Birds may be exported beyond the limits of Southern Rhodesia without a written permit.

Shooting on Private Land.—A licence does not entitle the holder thereof to shoot on private land without the permission of the land-owner.

No. 243 of 1912.]

[18th July, 1912.

GAME LAW CONSOLIDATION ORDINANCE, 1906.

UNDER and by virtue of the powers vested in me by section 4 (2) of the "Game Law Consolidation Ordinance, 1906," I do hereby suspend the operation of the said Ordinance, in so far as it relates to the destruction of hippopotami, on the farms Impofhoe and Hippovale, in the district of Hartley, and in such portions of the rivers Serui and Umfuli as are contiguous to the said farms, for a period of one year from the 19th July, 1912.

No. 390 of 1912.]

[19th December, 1912.

PROTECTION OF LOCUST BIRDS.

UNDER and by virtue of the powers vested in me by the "Game Law Consolidation Ordinance, 1906," I do hereby declare that the following Locust Birds:—

- (1) Great Locust Bird or White Stork (*Ciconia alba*);
- (2) Lesser Locust Bird or Nordmann's Pratincole (*Glareola melanoptera*);
- (3) Small White Heron or Cattle Egret (*Bubulcus ibis*);
- (4) Wattled Starling (*Dilophus carunculatus*);

are added to class "A" of the said Ordinance, and shall be strictly protected, and not hunted or destroyed, throughout Southern Rhodesia for a period of five years from date hereof.

No. 110 of 1908.]

[16th April, 1908.

IMPORTATION OF CATTLE.

UNDER and by virtue of the powers conferred on me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and repeal so much of the Regulations published under Government Notice No. 187, dated the 26th of July, 1906, as relate to the importation of cattle from the Colony of the Cape of Good Hope and the United Kingdom of Great Britain and Ireland, and make the following provisions in lieu thereof:—

1. The importation of cattle may be permitted from the Colony of the Cape of Good Hope and the Orange River Colony on the following terms and conditions—

- (1) A permit shall be required from the Chief Inspector which may contain such conditions as shall from time to time appear expedient.
- (2) Applications for permission to import shall be in the Form "A" attached hereto, and accompanied by a declaration in the annexed Form "B"
- (3) The importation of cattle with more than two permanent central incisor teeth shall not be permitted.
- (4) All importations shall be by rail and for the purposes thereof Bulawayo shall be regarded as the port of entry.

(5) All cattle imported in terms of these Regulations shall on arrival at Bulawayo, Salisbury, or Umtali be removed to a place of quarantine under the supervision of an Inspector of Cattle, there to be submitted to such examination and tests as the Chief Inspector may direct. If such examination or tests disclose the existence of any destructive disease the cattle shall be immediately destroyed and the carcases thereof disposed of in such manner as a Government Veterinary Surgeon may authorise or require. The Chief Inspector may permit of any examination or tests as aforesaid being dispensed with in the case of cattle in transit by rail for any place beyond the boundaries of Southern Rhodesia.

(6) All expenses or losses incident to quarantine, examination, testing or destruction as aforesaid shall be borne by the owner of the cattle.

2. The importation of cattle from the United Kingdom of Great Britain and Ireland may be permitted under the following terms and conditions—

(1) Importation shall be through and direct from the coast ports of the Cape Colony, and there shall be a consignment note or other satisfactory evidence that cattle so imported have come direct from Great Britain or Ireland.

(2) The provisions of sub-sections (5) and (6) of section 1 hereof shall apply to importations in terms of this section.

3. No person shall import cattle in terms of these Regulations except for his own use, provided however that permission may be granted to import for others on the applicant disclosing the name of the person or persons for whom he proposes to act.

4. Any person introducing cattle in contravention of these Regulations, or failing to comply with any conditions attached to permits to import, or furnishing applications, declarations, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, testing, destruction or disposal of carcases, shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months, unless higher or greater penalties shall have been provided for such offences by the "Animals Diseases Consolidation Ordinance, 1904," provided however that the penalties imposed by these Regulations shall not exempt any cattle from destruction in terms of the aforesaid Ordinance.

ANNEXURE "A."

APPLICATION FOR CATTLE IMPORTATION PERMIT.

1. Applicant's Name and Address.....
2. Number and Class of Cattle to be imported.....
3. Area or Farm and District where Cattle are at present located.....
4. Area or Farm and District to which Cattle are to be moved.....

Applicant's Signature.....

Date.....

Application.....

Permit No.....

ANNEXURE "B."

I,
 residing on the farm
 in do solemnly and sincerely
 declare that the (number in
 writing) animals also enumerated below have been in my possession since
 birth, and that lung sickness, pleuro-pneumonia or other contagious or
 infectious disease has not existed amongst any of my cattle, nor on my
 farm, nor among any cattle with which these animals have been in contact
 within the last four years, and that these animals have never been exposed
 for sale in any public market or stock fair, nor been in contact with strange
 cattle, and that to the best of my knowledge and belief such cattle in
 travelling to Station (i.e., station where cattle
 are to be trucked) will not come into contact with any animals amongst
 which lung sickness or any other contagious or infectious disease has existed
 during that period.

Number of Animals Bulls Heifers

Breed

Seller's Name and Address

Purchaser's Name

Place in Southern Rhodesia to which animals are being sent

And I make this solemn declaration conscientiously believing the same to
 be true.

Declared to at on this
 day of before me,

.....
 Resident Magistrate for the district of

No. 60 of 1913.]

[13th February, 1913.

IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals
 Diseases Consolidation Ordinance, 1904," I do hereby authorise the importa-
 tion from the Kingdom of the Netherlands of cattle required for *bona fide*
 breeding purposes; provided, however, that such importation shall *mutatis*
mutandis be subject to the provisions of Government Notice No. 110 of the
 16th April, 1908, relating to the importation of cattle from the United King-
 dom of Great Britain and Ireland.

No. 47 of 1913.]

[6th February, 1913.

IMPORTATION OF SHEEP, GOATS AND PIGS.

UNDER and by virtue of the powers vested in me by the "Animals
 Diseases Consolidation Ordinance, 1904," I do hereby declare that the in-
 troduction of sheep, goats and pigs against which no prohibition exists may
 be permitted from overseas, *via* the port of Beira, under the following con-
 ditions:—

- (1) Umtali shall be the port of entry;
- (2) that all such importations shall be in accordance with the regula-
 tions now in force or as amended from time to time;
- (3) that all animals shall be transferred directly after disembarkment
 to the railway trucks at Beira and conveyed thence to Umtali
 without leaving the said trucks.

REGULATIONS UNDER WHICH STOCK IS ALLOWED TO PASS IN
TRANSIT THROUGH THE TERRITORY OF THE MOZAMBIQUE
COMPANY.

WITH reference to Government Notice No. 47 of 1913, the conditions under which stock is allowed to pass in transit through the territory of the Mozambique Company are published below for public information :—

(By "stock" is meant : horses, cattle, mules, donkeys, sheep, goats, pigs and dogs.)

I. The Customs official shall not allow disembarkation of any kind of stock at the port of Beira, when the said stock is in transit to Rhodesia, before a written permission from the Veterinary Department stating therein that disembarkation can take place.

II. In order to obtain this permit, mentioned in the foregoing article, the owner or his representative, who may be his Custom house broker, must have a written application for such permit, to the Chief Veterinary Surgeon of the Companhia de Mocambique, giving at the same time the following particulars, in writing :—

- (a) the number of heads of stock to be landed ;
- (b) kind of stock ;
- (c) what country the stock comes from, giving the name of the region ;
- (d) the destination of such stock.

III. The importer, or his representative, must present at the same time the following certificates :—

- (a) one certificate from a Veterinary Surgeon of the country of origin of the said stock, stating that the region is free from any epizootic disease and that all the animals are also free from any such diseases ;
- (b) a certificate signed by the captain of the ship which brought the stock, stating the number of deaths, if any, which have occurred during the voyage and if possible the cause of death.

IV. Having received the above-mentioned certificates and the information required by the foregoing articles, one of the Veterinary Surgeons of the Companhia de Mocambique, or their substitute, will proceed to inspect the stock on board the ship.

V. If during the inspection the Veterinary Inspector suspects the presence of any contagious disease, he will with the least possible delay investigate the case, and if his suspicions are confirmed and he has reason to believe that the disease in question might spread within the Territory of the Companhia de Mocambique, he shall refuse to issue the permit referred to in Article I. of this order.

VI. If after the inspection the Veterinary Surgeon or his substitute is satisfied that there is no danger in allowing such stock to pass through the Territory in transit, he shall issue the permit referred to in Article I. of this order.

VII. The Chief of the Customs Department, having received the permit referred to in Article I., shall allow disembarkation of the said stock under the following conditions :—

- (a) the only means by which any stock can be taken through the Territory is by rail ;
- (b) that the stock should be taken directly after the disembarkation from the lighters to the railway station and placed in wagons or

trucks. The windows and other openings for ventilation in the wagons should be covered up with wire netting, the meshes of which are small enough to prevent the entrance of biting flies, etc. ;

- (c) having once been entrained, the animals will not be allowed to leave those wagons or trucks whilst they are in the Territory of the Companhia de Mocambique ;
- (d) that any forage or hay that may be landed for the use of the stock to which this order refers, if not utilised for the purpose, will be burnt if between the time of disembarkation and the departure of the stock by train it has not been consumed, despatched or re-exported.

Any contravention of this order shall be considered a transgression, and as such be dealt with according to No. 3 of Article 74 of the Customs Regulations in force.

The authorities and every one whom it may concern to abide by and obey.

No. 211 of 1910.]

[4th August, 1910.]

IMPORTATION OF CATTLE FROM NORTH-WESTERN RHODESIA.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that, notwithstanding the prohibition contained in Government Notice No. 89 of 1903, the importation of cattle from North-Western Rhodesia may be permitted under the following terms and conditions :—

1. The permission of the Chief Inspector of Cattle shall be first had and obtained.

2. All cattle shall be introduced (a) by rail via the Victoria Falls, or (b) by way of the town or port of Feira, which are hereby declared to be ports of entry.

3. All applications for permission to import shall be accompanied by a certificate by a Government Veterinary Surgeon of North-Western Rhodesia that—

- (a) the districts from which they come and through which they pass are free from contagious diseases of animals ;
- (b) the animals in respect of which the application is being made have been examined and are free from contagious diseases of animals.

4. All cattle shall on entry be taken, where possible by rail, to such quarantine area and shall remain in quarantine for such period as the Chief Inspector of Cattle shall direct, but not less than three months.

5. Any person found introducing cattle in contravention of these regulations, or failing to comply with any of the conditions attached to permits to import, or furnishing applications, certificates, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, etc., shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months; provided, however, that the penalties imposed by these regulations shall not exempt from liability to penalties, forfeiture, or destruction, elsewhere provided for

ANNEXURE "A."

Certificates under Section 3.

(a) I hereby certify that I have examined the following cattle belonging to Mr.

.....cows and heifers,

.....calves,

.....oxen and bulls,

and that the districts from which they come and through which they will pass in this Territory *en route* to Southern Rhodesia are to the best of my knowledge free from all destructive diseases of cattle.

Signed.....

Government Veterinary Surgeon.

(b) I hereby certify that I have examined the following animals belonging to Mr.

.....cows and heifers,

.....calves,

.....oxen and bulls.

In my opinion these animals are free from all destructive diseases.

Signed.....

Government Veterinary Surgeon.

NOTE.—All numbers are to be expressed in words.

No. 375 of 1912.]

[28th November, 1912.

IMPORTATION OF POULTRY.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended by the "Animals Diseases Amendment Ordinance, 1910," I do hereby declare and make known that the following regulations shall be in force and effect from date of publication hereof :—

(1) All poultry imported by rail shall be inspected by an Inspector or Sub-Inspector at Plumtree, Bulawayo or Umtali.

(2) Should any consignment of poultry shew symptoms of disease, or should such Inspector or Sub-Inspector have reason to believe that any disease exists in, or that infection is likely to be conveyed by such consignment, he may order the detention and isolation of the whole consignment for such period as he may deem necessary.

(3) The Chief Inspector may order the destruction of all poultry which he has reasonable grounds for believing to be diseased or likely to convey infection.

No. 391 of 1908.]

[17th December, 1908.

BRANDS ORDINANCE AMENDMENT ORDINANCE, 1908.

UNDER and by virtue of the powers vested in me by the "Brands Ordinance, 1900," as amended by the "Brands Ordinance Amendment Ordinance, 1908," I do hereby cancel and withdraw the Regulations published under Government Notice No. 204 of 1900, and declare the following shall be in force in lieu thereof, from and after the 7th January, 1909 :—

1. The Registrar of Brands shall have his office in the Agricultural Department. With the exception of the Magistrate of Salisbury, the Magistrate in each district of Southern Rhodesia, and the Assistant Magistrate in each sub-district, shall be a deputy Registrar of Brands for the magisterial district or sub-district to which he is appointed. The offices of the Deputy Registrars of Brands shall be the offices of the several Magistrates.

2. (a) The form of application for registration of a brand shall be that marked "A" in the Schedule attached to this Notice.

(b) The form of a certificate of registration shall be that marked "B" in the said Schedule.

(c) The form of a transfer of a brand from one registered proprietor to another shall be that marked "C" in the said Schedule.

(d) The form of a certificate of such transfer shall be that marked "D" in the said Schedule.

3. Each Deputy Registrar of Brands shall keep a register, in the form of Schedule "E" hereto, of all brands allotted within his district under the provisions of the Ordinance.

4. Save as hereinafter provided, every registered brand shall consist of two letters and a numeral of plain and uniform pattern; and the first of the letters shall indicate the magisterial district or sub-district in which the holding is situate on which the brand is to be used, and shall be placed above the numeral and letter comprising the brand, so as to be in triangular form.

5. One brand and no more shall be allotted to any person in one magisterial district or sub-district.

6. The size of the characters branded on stock shall not be more than three inches in height nor more than two inches in width.

7. An applicant for a brand shall be allotted the next vacant brand assigned to the district in which he is located, as set forth in Schedule "F" hereof.

8. Each Deputy Registrar shall keep a list of brands assigned to his district, for the inspection of applicants for brands.

9. There shall be payable to the Registrar or Deputy Registrar—

(a) For every separate registration of a brand, 5s.

(b) For every transfer of a brand, 5s.

10. All brands shall be imprinted on stock as follows:—

(a) In the case of horses, mules or donkeys, the first brand shall be imprinted either on the near side of the neck or near rump, and any second or subsequent brand shall (where there is sufficient space for such purpose) be imprinted on the same part of such animal, and at a distance of not less than one and a half inches from and directly underneath last imprint, according to the table herein set forth.

Where there is not sufficient space for the purpose, then such second or subsequent brand shall be imprinted on the part of such animal next in order, according to the following table:—

- i. Off Neck or Rump (or Thigh);
- ii. Near Shoulder (or Top of Arm);
- iii. Off Shoulder (or Top of Arm).

(b) In the case of cattle, the first brand shall be imprinted on the near rump or thigh of the animal, and every second or subsequent

brand shall be imprinted at a distance of not less than one and a half inches from and directly underneath the brand last imprinted, according to the following table :—

- i. Off Rump (or Thigh);
- ii. Near Shoulder (or Top of Arm);
- iii. Off Shoulder (or Top of Arm).

(c) In the case of sheep and goats, the first brand shall be imprinted on the near shoulder, and all second or subsequent brands in the following order :—

- i. On Near Side or Ribs;
- ii. Near Rump (or Thigh);
- iii. Off Shoulder;
- iv. Off Side or Ribs;
- v. Off Rump (or Thigh).

(d) In the case of ostriches :—

- i. On Near Thigh;
- ii. On Off Thigh.

11. Each proprietor of a registered brand shall have the right, in addition to imprinting his brand in the manner above prescribed, to place such brand on the ears of such animals by punching, tattooing or ear-rivets.

12. The owner of any brand may surrender the same, and the Registrar shall, on receipt of notice thereof, cancel the registration by notice in the *Gazette*.

13. When it appears to the Registrar, upon the report of a Deputy Registrar, Native Commissioner, or Cattle Inspector, that a registered brand is not in use, he may cause notice thereof to be given to the owner thereof, calling upon him to shew cause why the same should not be cancelled; if cause is not shewn to the satisfaction of the Registrar within six months after such notice, he may cancel the brand.

14. No brand which has been surrendered or cancelled shall be re-allotted until a period of five years from such surrender or cancellation has elapsed.

15. The Registrar shall, at the end of each quarter in every year, or as soon thereafter as possible, transmit for publication in the *Gazette* a statement, in the form of Schedule "E" hereto, of all brands registered under the Ordinance up to the last day of such quarter.

16. The Registrar shall allot a brand to every public pound already or hereafter to be established, and shall register the same.

The first character of every such brand shall be a diamond, and the second the dominant letter of the magisterial district or sub-district, and the third a numeral, the dominant letter to be placed above the diamond and numeral, so as to form a triangle; and the Poundmaster shall, on sale of any stock impounded therein, brand the same with such brand on the portions and in the order prescribed in these Regulations, to shew that the said brand is the last brand at that time imprinted on such stock; and any Poundmaster who shall fail to comply with the provisions of this section shall on conviction be liable to a fine not exceeding £5.

No. 396 of 1912.]

[26th December, 1912.

RABIES.

UNDER and by virtue of the powers vested in me by section 59 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare all the districts of Southern Rhodesia to be an area coming under the operation of Part VI. of the said Ordinance, and I do further hereby publish the sub-joined regulations for preventing the spread of the disease known as rabies :

1. The regulations published under Government Notice No. 45 of 1909, as amended by Government Notices Nos. 284 of 1911 and 260 of 1912, are hereby repealed, but nothing herein contained shall affect the validity of current notices issued by the Administrator in terms of the said regulations.

2. Any Magistrate, Police Officer, Native Commissioner, Government Veterinary Surgeon, or other official vested with the performance of functions under the "Animals Diseases Consolidation Ordinance, 1904," may on its appearing to him that any dog or other animal is shewing symptoms which justify investigation as to whether such dog or animal is suffering from rabies or not, order the proper detention, isolation and control of such dog or animal, either in the hands of the owner or at some other suitable place.

3. Should any dog shew symptoms which lead to the suspicion that such dog may be suffering from rabies, the owner thereof shall forthwith notify the fact to the nearest official vested with powers under these regulations, who shall immediately report the same to the Chief Veterinary Surgeon, and shall either destroy the said dog or isolate and secure it for further observations.

4. On its appearing that any animal is actually suffering from rabies, any of the above-mentioned officials may order the destruction of such animal, or may himself destroy it, and may further take control of or destroy, if deemed necessary, any animal which has been in contact with a rabid animal or an animal suspected of being rabid.

5. The carcasses of all animals destroyed on account of their being infected with rabies shall be thoroughly burnt by the person or official destroying them, save that such parts as may be required for scientific investigation may be retained under proper precautions. In any case in which a human being has been bitten by a rabid animal, the head of such animal shall, if possible, be taken and sent to the nearest veterinary official.

6. (1) In the event of an outbreak of rabies occurring, the Administrator may, by notice in the *Gazette*, direct that all dogs within a radius of fifteen miles of such outbreak, or such other area as may be fixed, shall be kept in a safe enclosure or chained up for a period of not less than six weeks from such notification, or such other period as may be fixed, but may be taken out for exercise if kept on a chain or leash by the person exercising them.

(2) In the event of a suspected outbreak of rabies occurring, the Magistrate of the district may, and at the request of the Chief Inspector of Stock shall, direct that all dogs within a radius of fifteen miles, or such other area as may be deemed necessary, shall be kept in a safe enclosure or chained up for a period not exceeding four weeks, but may be taken out for exercise if kept on a leash or chain by the person exercising them.

(3) No dog shall be removed from any proclaimed area during such period of quarantine.

7. Notwithstanding the provisions of section 6 (1) and (2), packs of foxhounds, harriers, or beagles, duly registered as such before the Magistrate of the district in which their owner or owners reside, may be used for the purposes of the chase when under the ordinary supervision and control of not less than two persons engaged in the chase.

8. Any person contravening any of the above regulations, or failing to carry out any of the provisions thereof, shall be liable, on conviction, to a fine not exceeding £10 for each offence; or, in default of payment, to imprisonment with or without hard labour for a period not exceeding one month.

9. These regulations shall come into operation on the 1st day of January, 1913.

No. 336 of 1911.]

[26th October, 1911.

RABIES.

THE following instructions regarding the treatment of persons bitten by rabid animals are published for general information.

In every case where a person has been bitten by a dog or other animal known or suspected to be rabid, the following precautions are recommended :—

- (1) The wound should be immediately and thoroughly cauterised. This, if it does not altogether prevent the disease, delays its onset sufficiently for Pasteur treatment to be successfully applied.
- (2) The patient should be sent to Salisbury for treatment at once. Delays are dangerous.
- (3) The fullest information should be sent to the Health Department as to date when bitten, locality, fate of dog, and especially reasons for supposing the dog to be mad.

[1st July, 1912.

RABIES.

SEVERAL cases have recently occurred where dogs having bitten a person or persons, were immediately destroyed and report made that they were possibly infected with rabies. In such cases it is impossible for the Veterinary Department to say in less than 18 to 20 days whether the animals were infected or not, and then only when the head of the dog concerned is received at the laboratory in a good state of preservation. Thus valuable time is lost in the treatment of persons bitten, which may lead to fatal results.

In all cases the suspected animal should, if possible, be secured by a strong collar and chain and the circumstances reported by telegram to "Veteran," Salisbury, when full instructions will be given as to the treatment and observation of the suspected animal.

No. 240 of 1910.]

[1st September, 1910.

INSECT PESTS.

UNDER and by virtue of the powers vested in me by the "Nurseries Ordinance, 1909," I hereby proclaim the undermentioned insects to be pests within the meaning of the said Ordinance :—

- The Red Scale (*Chrysomphalus aurantii*).
- The Oleander Scale (*C. hederæ*).
- The Circular Purple Scale (*C. aonidum*).
- Ross's Black Scale (*C. rossi*).
- The Purple or Mussel Scale (*Lepidosaphes beckii*).
- The Long Scale (*L. gloverii*).
- The White Peach Scale (*Aulacaspis pentagona*).
- Woolly Aphis or American Blight (*Schizoneura lanigera*).

No. 228 of 1912.]

[11th July, 1912.

IMPORTATION OF PLANTS REGULATION ORDINANCE, 1904.

UNDER and by virtue of the powers vested in me by the "Importation of Plants Regulation Ordinance, 1904," I do hereby declare and make known that Government Notices No. 306 of 1911 and No. 35 of 1912 are hereby repealed, and section 17 of the Regulations published under Government Notice No. 141 of 1906 is hereby repealed and the following regulation substituted in lieu thereof :—

- "17. The introduction into Southern Rhodesia of any plant, not being seed, fruit, bulb, tuber, cut flower, vegetable or vegetable trans-plant originating in the Union of South Africa, not grown in a nursery registered at the Department of Agriculture, Pretoria, under the 'Agricultural Pests Act, 1911,' is prohibited, except under special permission from the Director of Agriculture, Salisbury, Southern Rhodesia, who may impose such conditions in regard to such importation as he may think fit."

No. 319 of 1912.]

[3rd October, 1912.

IMPORTATION OF POTATOES INTO SOUTHERN RHODESIA.

UNDER and by virtue of the powers vested in me by the "Importation of Plants Regulation Ordinance, 1904," I do hereby cancel the regulations published under Government Notice No. 309 of 1909, and do substitute the following in lieu thereof:—

(1) No person shall introduce into Southern Rhodesia from outside British South Africa any consignment of potatoes unless accompanied by a statement on oath from the consignor stating fully in what country, and district of that country, the potatoes were grown, and a certificate from the Department of Agriculture or other responsible Government body or official institution of that country to the effect that the disease known as "warty disease" or "black scab," caused by the fungus *synchytrium endobioticum* Percival, is not known to occur on the farm or premises on which the potatoes were grown. Any consignment not accompanied by such documents will be liable to be seized and destroyed.

(2) Any consignment of potatoes imported from other parts of South Africa or from overseas, if found on inspection to be infested with the pest known as "root gall worm" (*hedeoedera radicola*) will be refused admittance to Southern Rhodesia or destroyed.

(3) Should any consignment on arrival be found to be infested with "warty disease" or "black scab," it will be totally destroyed.

(4) Any person guilty of a contravention of these regulations will be liable to a fine not exceeding £10.

No. 249 of 1908.]

[27th August, 1908.

PROTECTION OF TREES.

IT is hereby notified for public information that any person who shall cut down for use as fuel, or for any other purposes than bona-fide farming, mining or manufacturing purposes, or cause to be so cut down the "Wild Westeria" (native name M'Pakwa or M'poea) tree, will be liable to prosecution for contravention of the provisions of the Forest and Herbage Preservation Act, 1859, and upon conviction to a fine not exceeding £100, or to imprisonment with or without hard labour for a term not exceeding six months, or to such fine and imprisonment, or to such imprisonment without a fine.

No. 91 of 1913.]

[20th March, 1913.

DESTRUCTION OF WILD CARNIVORA.

IT is hereby notified for public information that His Honour the Administrator has been pleased to cancel Government Notices No. 216 of 1911 and No. 387 of 1911, as from the 31st instant, from which date rewards for the destruction of wild carnivora will be discontinued.

No. 81 of 1913.]

[13th March, 1913.

ESTABLISHMENT OF POUND ON FARM PAGATI.

UNDER and by virtue of the powers vested in me by section 5 of "The Pounds and Trespasses Ordinance, 1903," I do hereby declare and make known that, at the request of the Native Commissioner, Fort Usher, a pound has been established on the farm Pagati, in the district of Matobo, and that the said pound shall be available for the public from 15th March, 1913.

No. 211 of 1909.]

[16th September, 1909.

PRODUCE FROM NATAL AND TRANSVAAL.

UNDER and by virtue of the power vested in me by section 8 (2) of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby prohibit the introduction from Natal and the Transvaal of the undermentioned produce thereof:—Grass, straw, hay, lucerne hay, forage, green lucerne, sugar cane, or any other bedding or fodder plant.

Department of Posts and Telegraphs,

Southern Rhodesia.

Postal Notice No. 24 of 1909.

AGRICULTURAL PARCELS POST.

IT is hereby notified for public information that, on and after the 1st August, 1909, any article produced, and, if manufactured, produced and manufactured within Southern Rhodesia may be transmitted by Agricultural Parcels Post at the reduced rate of sixpence for the first lb., and threepence for each subsequent lb. or fraction thereof, up to a limit of eleven lbs. in weight.

The Agricultural Parcels Post is designed to bring the producer into direct communication with the consumer, and is available for the transmission of:—

Biscuits	Dried Meats	Plants
Bread	Eggs	Poultry
Butter	Flour	Seeds
Confectionery	Flowers	Sugar
Cigarettes	Honey	Tobacco
Dried & Bottled Fruits	Jam	Wool Samples

and other articles produced within Southern Rhodesia. It does not extend beyond the borders of Southern Rhodesia.

The senders of articles at the reduced tariff applicable to the Agricultural Parcels Post will be required to sign a declaration that the contents are the *bona fide* produce of Southern Rhodesia.

The limits of size and weight, and the general regulations, are those applicable to the Inland Parcels Post.

This scheme must be regarded as purely experimental, and the Government reserves the right to modify these special rates of postage should too great a financial loss result.

G. H. EYRE,

Postmaster General.

General Post Office, Salisbury,
20th July, 1909.

REDUCED RATES FOR SALT (COARSE AND ROCK) FOR STOCK FEEDING.

THE Beira and Mashonaland and Rhodesia Railways announce that with effect from 1st March, 1913, coarse and rock salt in bags, in lots of not less than 15 tons or paying therefor, will be conveyed *via* Vryburg to all stations on these lines—Rhodesia Katanga Junction Railway excepted—at a rate of 1d. per ton per mile, owner's risk.

Reductions are also made in the rate for salt of similar description conveyed under the foregoing conditions from Beira to stations in Rhodesia; for particulars apply to Traffic Manager and Stationmasters.

RATE FOR ARSENITE OF SODA FOR DIPPING PURPOSES.

THE Beira and Mashonaland and Rhodesia Railways announce that with effect from 1st March, 1913, arsenite of soda, declared to be for cattle and sheep dipping purposes, will be carried at the rates applicable to cattle and sheep dip and dip powder, owner's risk.

RATE FOR GUANO AND FERTILISERS.

THE Beira and Mashonaland and Rhodesia Railways announce that with effect from 1st March, 1913, the scale of rates for the carriage of guano and fertilisers at owner's risk, minimum one ton or paying therefor, is revised as follows:—

Between All Stations.

1. Beira to Broken Hill, including Selukwe and West Nicholson Branches, also Vryburg to Bulawayo and beyond, except on sections 2 and 3 hereunder: Distances not exceeding 480 miles, 2d. per ton per mile, subject to a maximum of £2 per ton. 481 miles and over, 1d. per ton per mile.

2. Lomagundi, Mazoe and Blinkwater Branches: 2d. per ton per mile.

3. Rhodesia Katanga Junction Railway—Broken Hill—Congo Border: Minimum 5 tons, 6d per ton per mile. Minimum 1 ton, 7d. per ton per mile. Minimum charge 2s. 6d. per ton.

REDUCED RATES FOR CEMENT FOR IRRIGATION PURPOSES.

THE Beira and Mashonaland and Rhodesia Railways announce that with effect from 1st January, 1913, cement certified to be for use in connection with irrigation works for agricultural purposes will be conveyed over all sections of these lines (Broken Hill-Congo Border section excepted) at the rates and conditions laid down in clause 40 of Goods Tariff Book No. 5.

TEMPORARY REDUCED RATE FOR HAY.

THE Beira and Mashonaland and Rhodesia Railways announce that with effect from 1st April, 1913, the following reduced rates for Hay will apply as a temporary measure, station to station, owner's risk, minimum charge as for four-ninths the marked carrying capacity of the truck:—

Hartley to Bulawayo, £1 14s. 8d. per ton; Gadzema to Bulawayo, £1 15s. per ton; Makwiro to Bulawayo, £1 16s. 6d. per ton; Norton Siding to Bulawayo, £1 17s. 6d. per ton.

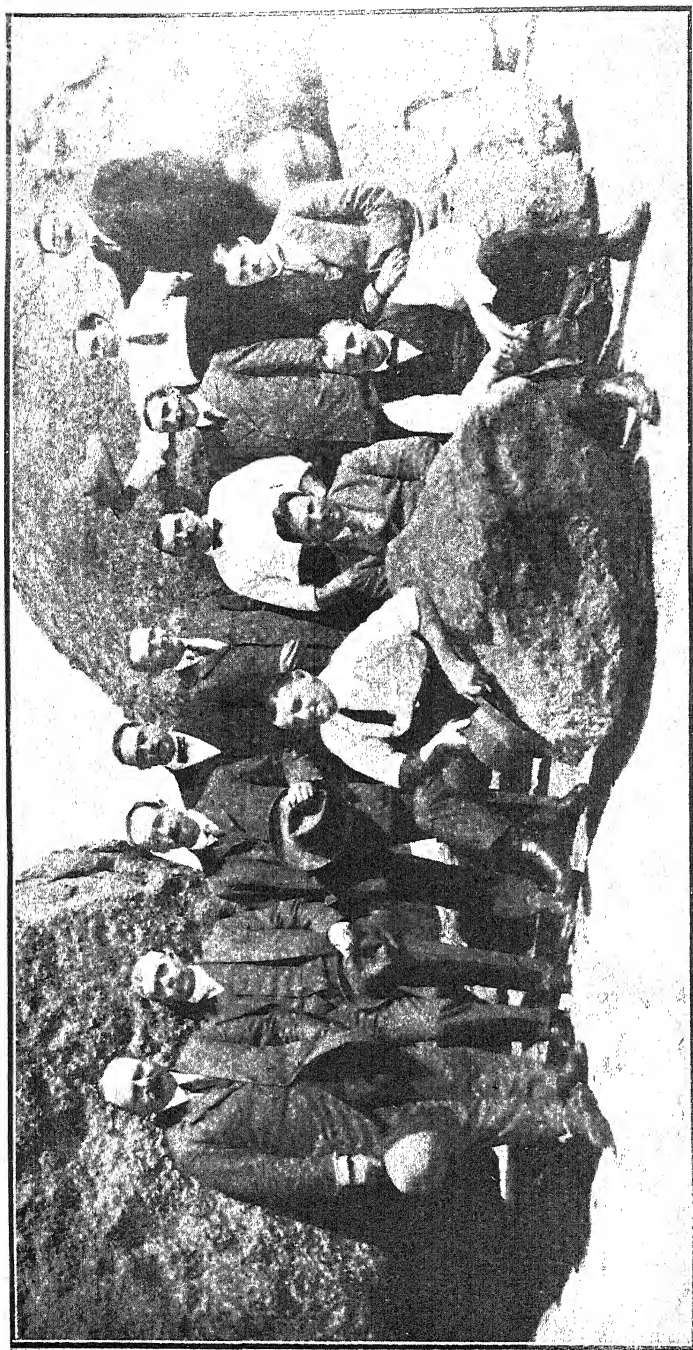
RATE AMENDMENTS.

THE Beira and Mashonaland and Rhodesia Railways announce that, with effect from 1st March, 1913, the following amendments have been made to Goods Tariff Book No. 5:—

Page 22: Flour of Sulphur—reclassified at rate No. 3.

Page 23: Scalecide (for spraying trees) is included as spraying materials in clause 57.

Page 34: Petrol and Paraffin Tractors, used solely for ploughing and agricultural purposes, are included as agricultural implements in clause 57.



Delegates to the Veterinary Conference, held in Bulawayo, April 10-14, 1913.

Top row, from left to right :—Messrs. R. J. Sturdy (British East Africa), C. E. Gray (Union of South Africa), W. Robertson (Union of South Africa), F. Verney (Basutoland), J. M. Sinclair (S. Rhodesia), E. R. Edmunds (S. Rhodesia), J. Botello (Lourenço Marques), G. Garden (Nyasaland), L. van Raes (Belgian Congo). Sitting, from left to right :—Messrs. H. L. Jones (Mozambique Co.), W. A. Elder (Swaziland), W. H. Chase (Bechnaland), F. Chambers (N. Rhodesia).



THE RHODESIA Agricultural Journal.

*Edited by the Director of Agriculture,
assisted by the Staff of the Agricultural Department.*

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Editorial.

Correspondence on subjects affecting the farming industry of Southern Rhodesia is invited. Enquiries will be replied to direct, or through the medium of the JOURNAL. An interchange of ideas and suggestions between farmers will be particularly welcomed. Contributions of a suitable nature for insertion in this JOURNAL will be much appreciated. All communications regarding these matters, and advertisements, should be addressed to the Editor, Department of Agriculture, Salisbury.

LEGISLATIVE COUNCIL.—The recent session of the Legislative Council was productive of three new Ordinances affecting the farming community. Particulars regarding these will be found in subsequent pages, but readers may here be reminded that these laws are not in force until promulgated, and are subject to the approval of His Excellency the High Commissioner. The first Ordinance deals with the utilisation of water for purposes of irrigation in the Territory, and places farmers in a favourable position for the fair distribution and use of water by means which obviate, as far as possible, complicated legal proceedings. Another Ordinance provides for the prevention of veld fires, and should be carefully studied by all owners of land, as in some ways new principles are introduced

and considerable powers given the farmer for his own protection. The third Ordinance is a brief one, improving the existing animal diseases law with regard to lungsickness, a disease which it is hoped may be prevented from invading this Territory.

DIPPING TANKS.—Owing to the unfortunate necessity for rigid economy in public expenditure, it is notified for general information that the Government has suspended the grant-in-aid of £50 towards the construction of dipping tanks on private farms. This will, however, not affect the payment of grants promised during the last twelve months, provided the tanks are completed during the current year. Perusal of the grants made to date shew that many applicants are persons not in real need of pecuniary assistance. The attention of those desirous of erecting dipping tanks is directed to the system of small loans on personal security now offered by the Land Bank, and intended especially to meet such cases.

PROPOSED AGRICULTURAL COLLEGE.—In view of the warm welcome accorded the proposal to establish an agricultural college in Southern Rhodesia at the last Congress, many farmers will no doubt be disappointed to learn that at the recent session of the Legislative Council the general opinion of private members was that on financial grounds it was inexpedient to proceed with the scheme this year. It is satisfactory to note, however, that no serious objection was taken to the proposals; indeed, they were generally warmly approved, and it is to be hoped that no difficulties will arise next session in obtaining the necessary funds. A valuable year, however, has been lost, as an institution of this sort cannot be put in active operation by a stroke of the pen, and meanwhile the need and demand for agricultural education is increasingly manifest.

THE CREAMERY, GWELO.—A butter factory at Gwelo has now been inaugurated, and it is hoped that the farming public will take full opportunity of the facilities offered for the disposal of cream. It is obvious that the supply cannot be immediately provided, and that many arrangements have to be made in advance before any quantity of cream can be assured from a large number of farms. Until the creamery was established,

it was impossible for farmers to go in largely for dairy cattle. There are, however, ample indications they are now doing so, and the supply of cream may be confidently anticipated steadily to increase. The progress of the butter factory will be eagerly watched by every farmer in Rhodesia, and we wish it every success.

IMPORTATION OF CATTLE FROM ENGLAND.—Arrangements have been made, and an order despatched, for the importation from England of a number of cattle on behalf of farmers on the same lines as in previous years. Any one still desiring to import cattle may make application to the Department of Agriculture, as a further purchase at a later date may possibly be arranged. The stock on arrival will be inoculated as heretofore.

THE GAME LAW.—For sometime the opinion has generally been held that the Game Law required revision, and to be made more applicable to the existing conditions of the country. The subject is one of considerable moment, for whilst the game must give way to the progress of civilisation, yet it would be a matter for lasting regret if the indiscriminate slaughter or total extermination of wild fauna were permitted. We are glad, therefore, to see the resolution moved by Mr. Eyles in the Legislative Council and accepted by the Government regarding the desirability of amending the present Game Law, and hope that before very long legislation will be enacted which, whilst adequately protecting the interests of the farmer, will provide for the preservation under suitable conditions of such species of game as are now rapidly disappearing.

HARTLEY FARMERS' GALA.—The farmers of the Hartley district achieved a great success and gave a notable lead to others on the 9th and 10th of May, when they inaugurated a show of farm produce which it is hoped will be an annual institution and the forerunner of larger things. The occasion was taken of including with the exhibition a social gathering and several meetings, a combination which had the happiest results. Under the auspices of the Farmers' Association, with Mr. T. Savory in the chair, the first day was devoted to the serious task of attending no fewer

than five separate lectures, delivered during the course of the afternoon and evening. These were very well attended, and led to interesting discussions and the interchange of opinions which perhaps forms not the least valuable feature of such gatherings. The papers read were :—"The Care of Cattle on Mixed Farms," by Dr. E. A. Nobbs; "Agricultural Co-operation," by Mr. T. Savory; "The After-Products of the Maize Crop," by Mr. J. A. T. Walters, B.A.; "Reinforced Concrete," by Mr. S. Knutzen, and "Proportional Representation," by Mr. W. M. Leggate, M.A. The various addresses were followed with the closest interest by an attentive and appreciative audience.

On the second day an exhibit of agricultural produce took place in the sports ground, where a very large number of products was shewn, giving rise to good competition. The exhibits were judged by Mr. Walters, of the Department of Agriculture. The prize tickets carried no money, so that competitors vied with one another for the bare honour, which was happily found to be sufficient inducement to produce keen and friendly rivalry, and to bring out a splendid show of mealies, hay of various kinds, sorghum, manna, beans, ground nuts, sun-flowers, roots, pumpkins, melons and potatoes. The collections of vegetables were particularly fine, and proved the varied possibilities of the district. There was also a good display of citrus fruits, though, owing to the earliness of the date, these were hardly sufficiently ripe for show purposes; indeed, this was generally the case with much of the produce shewn. Butter, although a large entry, was rather disappointing in quality.

A feature of the show was the fine display of honey and bees by Mr. Frederick Swarder. A beautiful exhibit of bright Virginia tobacco by Mr. Knight, of Hippovale, also deserves mention. Exhibits of agricultural implements were shewn by a number of firms, and attracted the attention of farmers and others.

No entrance fee was required, nor was any charge made for admission, but towards the end of the day all exhibits unremoved were sold by public auction. During the day various meetings of farmers and small workers were held, and the Hartley Farmers' Association was "At Home" to visitors in the show ground. In the evening Colonel Edwards, C.B.,

M.V.O., Commandant General, addressed a well-attended meeting on the subject of Defence.

Mr. Savory and his co-workers are to be heartily congratulated on the success attending their efforts, and other districts may be encouraged to follow this excellent example. The show and the attendant meetings, lectures and social intercourse cannot but serve to encourage farming, and to create good feeling amongst the community—an end very much to be desired in this country of great distances and lonely homesteads. On the Sunday, very fittingly, a harvest thanksgiving service was celebrated.

AGRICULTURAL CO-OPERATION.—In his lecture on the possibilities of agricultural co-operation in Rhodesia, Mr. Savory indicated a large number of directions in which the principle might advantageously be adopted by farmers to-day. He cited instances of compulsory co-operation on irrigation works from the days of ancient Egypt to modern times, and referred to the success co-operation had attained in the Orange Free State as well as to its application at the present time in Rhodesia. In this latter connection he alluded to the farmers' co-operative societies at Salisbury and Umtali for the disposal of maize; the newly-created co-operative credit society at Umtali for the encouragement of the dairy industry; and the joint ownership by farmers of mealie-shelling outfits. With regard to the latter, it was interesting to note that a crop of 5,200 bags of mealies had been picked by labour jointly supplied, husked, shelled and bagged in a remarkably short time—a great saving of labour being effected, with the additional advantage that it was possible to clear the land of the crop and plough before the soil dried out, thus getting the benefits of a fallow as well as killing the mealie stem borer. Proceeding, Mr. Savory pointed out that there were other openings for co-operative effort. This could be applied in the joint use of large and costly machinery, such as traction ploughs and harvesting implements; in the sale of other products besides maize; the purchase of live stock, mealie bags, seed and manure; in the employment of skilled men for treating tobacco; for combination to secure the low rates accorded to truck loads of farmers' requirements, such as salt, bone meal, molasses, bran, oil, etc. The speaker also spoke of

the usefulness of farmers' associations for the exchange of ideas, and, in conclusion, drew attention to the law specially framed to enable farmers in Rhodesia to readily and cheaply unite for their joint and individual advantage.

AFRICAN COAST FEVER.—Since the last issue of the *Journal* two outbreaks of Coast Fever have occurred, one on the Hatfield plots, adjoining Salisbury commonage, and the other on Mr. Strickland's farm, N'odzi, Umtali district. In the former case the disease was discovered in a small herd of eight head, and in a short time six animals died or were destroyed on shewing a rise of temperature. In each case the existence of the disease was demonstrated. Subsequently one animal in each of two adjoining herds shewed symptoms of Coast Fever and were destroyed. The temperatures of all the cattle involved are taken daily, and pending the erection of a dipping tank and the disposal of the cattle, spraying every third day is practised. The disease was discovered on Mr. Strickland's farm on the 28th April, and within a fortnight 28 head died or were destroyed. Fortunately the farm is fenced and a dipping tank available, and three-day dipping was at once begun. The temperatures of all cattle are taken daily, and any suspicious cases are at once destroyed. Fortunately there have been no movements of stock from the farm for a considerable period, and it is confidently expected that the disease will be restricted to its present area.

THE UMTALI CO-OPERATIVE DAIRIES.—The Umtali farmers are to be congratulated on the formation of a co-operative society, which may be expected to have a very considerable influence in developing the resources of that fertile district. The immediate aim of the society is to raise money on the joint personal security of members for the purpose primarily of purchasing stock, but the funds will also be used to procure requisites for dairying, such as separators, churns, conveying cans and the like. A further object is to assist members to dispose of their cream, and, if circumstances warrant, to establish a butter factory at Umtali.

It is satisfactory to learn that there is no difficulty anticipated as regards credit, and that a large membership has been secured. The intention is to purchase milch cows up to a value

of £150 for each member in any one year, or £300 in all at any one time. The stock must be bought through the society, and until paid for is subject to inspection by and under the control of the directors of the society.

As the first enterprise of the kind, this co-operative society will be watched with great interest, and, if successful, the plan will no doubt be adopted elsewhere, for capital is one of the chief needs of farming to-day in Rhodesia, and the system adopted provides a ready means of raising the necessary funds. At the same time the fact that all the members are jointly and severally liable for the obligations of the society gives ample security, whilst all members being known to each other ensures that cattle will be given only to those who can be relied on to take proper care of them.

BORING FOR WATER.—Farmers will be pleased to note that the British South Africa Company is prepared to assist them to bore for water by operating drilling machines. The charges will be calculated to cover working expenses, including depreciation on the plant, and interest at the rate of six per cent. per annum on the capital employed. Applicants are required to provide transport, and applications should be addressed to the Secretary, Commercial Branch, British South Africa Company, Bulawayo.

VETERINARY SURGEONS.—Two new Veterinary Surgeons have recently arrived in the Territory—Messrs. Lowry and Johnston—and these officers have already entered upon their duties at Bulawayo and Salisbury respectively. The Veterinary staff is required largely as a precautionary force available for emergency, and there is still ample scope for their activities in Rhodesia, in spite of the generally satisfactory condition of the health of live stock.

THE VETERINARY CONFERENCE.—The Conference of Veterinary Surgeons convened by His Excellency the High Commissioner to consider measures to combat rinderpest in case the outbreak should spread from German East Africa met at Bulawayo on the 10th April. All the British South African States and Dependencies were represented, and delegates were

also sent from British East Africa, Portuguese East Africa, the Mozambique territory and the Belgian Congo. Mr. J. M. Sinclair, Chief Veterinary Surgeon of Southern Rhodesia, presided. The conference sat for four days, during which period, in addition to rinderpest, such subjects as African Coast Fever, tuberculosis, Inter-Colonial movement of stock and importation from overseas, lungsiickness, epizootic abortion, trypanosomiasis and anthrax were discussed. Various resolutions were adopted, and these, after being sent to the High Commissioner, were submitted to the respective Governments. Every subject received careful consideration, and we feel sure that the exchange of ideas and experiences promoted by the discussions will be of considerable assistance to each delegate, and of value to the Government represented.

“STRIGA LUTEA.”—During a recent trip through the Chilimanzi-Gutu district Mr. Walters, Assistant Agriculturist, reports that he observed several mealie lands slightly infested with *striga lutea* (witch-weed or rooi-bloom). This pest is only too well known in certain localities in the Free State and Transvaal, where it is dreaded by the farmers on account of the havoc it plays with the maize plant in the growing stage. The plant can easily be recognised, as it only grows in any quantity in cultivated maize lands, and generally close up to the maize stalk. It stands about 12 inches high, has short, dark green leaves and bright scarlet flowers. The mealies in the neighbourhood of which it grows are invariably stunted in growth, and bear a diminutive cob, and this dwarfing is due to the parasitic action of the witch-weed, which attaches its own roots to those of the mealie. It produces an abundant crop of seeds, and if these are allowed to shed on the ground, they will continue to germinate over a very long period as opportunity arises, as the seeds retain their vitality for many years. In the Transvaal whole lands have to be abandoned for maize once this pest has got a hold in the soil. It behoves farmers, therefore, to pay special attention to the detection and eradication of this weed, by pulling up the plants before they seed and by burning them. Curiously enough, this pest does not seem to affect any other crops, and infested soil can safely be planted to other cereal, root or oil crops.

Extracts from the Report of the Director of Agriculture for the Year 1912.

The year has been marked by a drought of a nature unprecedented in Rhodesia, fairly general in its incidence, severe in parts, and the more serious in view of a deficient rainfall in the previous year. Actually the precipitation of rain amounted to from one-half to two-thirds of the normal, and the resulting drought was chiefly felt on account of the unpreparedness of the farmers for so unlooked-for an occurrence. Early in the season it became apparent that the crops would everywhere be light, and although, owing to the very local distribution of the rains, some individuals reaped good crops, the shortage overall amounted to a very considerable total. The native crops in general, owing to crude methods of culture, suffered much more than those of Europeans. As the season advanced the position became grave, and not only the crops, but the veld and the water failed, and the hardship in places was acute. Many districts, of course, hardly suffered at all, and less might have been heard of the drought but that it was most severely felt in the town and vicinity of Bulawayo, and in some of the more heavily stocked portions of the country towards Gwanda and Plumtree. The want amongst the natives proved less than was at one time anticipated, and private enterprise was, in a large measure, able to meet the requirements, but in some districts the Government intervention undoubtedly obviated starvation. Besides being light, the rains terminated unusually early, and consequently rivers, springs, wells and natural pools gave out sooner than usual, whilst the grazing almost everywhere was deficient, and in addition, owing to the excessive dryness, the veld was burnt sooner and to a greater extent than usual. Thus the suffering on account of the drought was artificially enhanced. Stock soon lost condition and became weak early in winter. The drought was prolonged on account

of the lateness of the rains in commencing. The season was, therefore, remarkable, not only for an insufficient rainfall in the wet period of 1911-12, but for a most unwontedly extended dry interval between the two rainy seasons. At the end of the year the drought broke up and general rains commenced, so that by Christmas the bulk of the farmers throughout Mashonaland had planted their crops, and, although Matabeleland was not as fortunate, still grass generally was assured, or at least the movement of stock to good grazing rendered possible. Severe as the drought has undoubtedly been, yet there is good reason for thankfulness that it was so fortunately terminated before it actually became disastrous, and that, though the country has suffered, it has not been ruined. The lessons taught by the drought are very clear. The first is the imperative need of protection of our veld against destruction by veld fires. Many bitter complaints have reached the Department on this score, and, whilst the damage and loss is bad enough at any time, it is especially so when grazing is everywhere scarce, and when pasture, carefully saved throughout the season as a stand-by in the drought, is destroyed in a few minutes. Second only to this is the importance of having a reserve of food for stock laid by in stacks of hay or forage, or in the form of silage, or as crops of melons, pumpkins, and roots. There are many sorts of winter feed possible which can be provided according to the character of the farm and the nature of the operations conducted, whether ranching, arable farming or dairying. The third great need which the drought has brought out is the want of proper water supplies on farms. Rivers, springs and pools have given out, and too often the absence of proper watering facilities for stock is due rather to want of foresight in developing adequate supplies than in real lack of the possibility of getting water. It is still too commonly the practice to let the cattle actually into the pools or dams, wasting and fouling the water, breaking down the banks and tramping out the springs. The importance of adequate supplies of clean water carefully protected against waste and contamination, and distributed so as to prevent undue concentration of stock at one point, can hardly be over-estimated under any conditions; but these measures become of primary importance in a country with an annual dry season of six to seven months, and the possibility of the repetitions of droughts such as we have lately come through. Perhaps the features most worthy

of notice are not the extent of the shortfall nor the unfortunate necessity for importation of grain, but rather the remarkably small diminution of farming activity in spite of unpropitious conditions, and the admirable fortitude displayed by those upon whom the calamity of drought has most severely fallen. The figures for importation of agricultural requisites and of breeding stock given elsewhere, and the continuation of farming operations everywhere evident, clearly shew that the check to progress is but transient; whilst abundant proof of the admirable spirit in which losses have been met has been repeatedly shewn in the regions of Gwanda, Matopos, Bulawayo and Plumtree, where the drought was most felt.

The drought seriously affected our export of maize to England, which, in the previous year, amounted to over 2,500 tons, valued at £10,240, and which this year ceased altogether. The exports of maize and maize meal to adjoining States were as nearly as possible unaltered, at £12,285, as against £12,258 in 1911. Not only was our oversea export of maize suspended, but a very considerable importation from Portuguese East Africa and the Union was necessary to make good our deficiencies. Whereas in 1911 the imports of maize and maize meal were 3,629,535 pounds, valued at £8,825, and our exports 9,211,131 pounds, valued at £22,498, leaving as a balance of trade an excess of exports over imports of 5,581,596 pounds, valued at £13,673, we find that in 1912 our importation of these articles rose to 27,176,887 pounds, valued at £77,437, and our exports were only 3,031,292 pounds, valued at £12,285; so that the balance of trade shews an excess of imports of 24,145,595 pounds, valued at £65,152. A small surplus available for export has thus been converted into a very much larger deficiency which had to be made up by purchases outside our borders. Similarly with the other great staple food on mines and kraals, kaffir corn, we find that a net export in 1911 of 389,351 pounds, valued at £1,051, has been altered in 1912 to a net import of 3,047,463 pounds, valued at £12,276. The figures are as follows:—In 1911 the importation of kaffir corn was 695,251 pounds, valued at £1,612, and the export of kaffir corn and meal together was 1,084,602 pounds, valued at £2,663; whilst in 1912 the imported amount was 3,211,449 pounds, valued at £12,881, and the export only 163,986 pounds, valued at £608. Before a balance for export is again available, we thus have in these two products to displace a net importation

of 13,596 tons of grain, valued at £77,428. Of course, even when we have large surpluses, a certain amount will always be imported on account of geographical advantages occasionally being with foreign producers, and because of seasonal differences whereby Portuguese East Africa is able to send us maize by the end of March, some time before our own harvests are ready. The coming crop, although excellent in parts, must shew the effects of the late commencement of the rains; whilst in portions of Matabeleland it is certain there will be no crop. Moreover, it cannot be ripe until well on in 1913. There is, therefore, good reason to suppose that there will be a considerable importation for some time, but that later on local supplies will again become available, and possibly plentiful. In view of the rapid extension of cultivation of maize, the following season (1914) may see again a surplus for export, even although local consumption should increase and more uses be found for maize as stock feed on the farm. There need be no cause for fear but that ere long we shall be again supplying our own needs and more. It is interesting to observe that, even in such a year as we have passed through, larger quantities as compared with the previous year were sent out to neighbouring States, of potatoes, onions, wheat, oats, barley, beans and peas; and, though the quantities are inconsiderable, yet the tendency, especially in an unfavourable season, is noteworthy. In spite of the unfavourable year, the increasing practice of growing a greater variety of crops, both in summer and in winter, on moist land or under irrigation is very generally apparent. This is a feature of the times deserving of every encouragement. The larger the number of crops grown in the country, the better will local needs be met, and the less prospect is there of over-production. The risk in case of failure of any one crop is diminished, whilst the advantages of a rotation are made available to the farmer. Maize must long remain the leading crop, and perhaps will always occupy the premier position, but a positive indication of good farming must always be the presence of other crops as well. It is remarkable how little "truck crop" vegetables of all sorts are grown on a farm scale, in spite of the exceptional markets that exist for this class of produce, both by the urban populations and on the mines. Citrus trees are being widely planted, and these in a few years must begin to bring in an abundant return, judging by such as are already in bearing. The sale of the 1911 tobacco crop in January, 1912,

realised very encouraging prices, the average figure for 453,495 lbs., exclusive of scrap, being 1s. 2½d. per lb., and the top price 3s. 7d., for a parcel of 900 lbs. grown by Messrs. Henderson and Walker, of Marandellas. The sale realised £30,101 2s. The 1912 crop was more than double the previous one in weight; and, though all qualities were represented, there appeared to be a larger proportion of the lower grades, due in part to the season and in part to so many beginners having taken up tobacco, who as yet lack knowledge and experience. Tobacco is being more widely grown each year, and is gaining ground in Umtali, Hartley and Lomagundi districts. Increased outlets for the crops are becoming a serious consideration for the future. The services of the Tobacco Expert, who assumed his duties on 9th September, 1911, have been in constant demand. There is every indication of a considerably increased acreage in tobacco in the coming season, and of a number of farmers growing and curing it for the first time, a fact which will be unavoidably reflected in the quality of the leaf grown by them. Fear is occasionally expressed of production exceeding the demand, and a slump ensuing. This is unlikely as regards bright leaf of good quality, for which there is always likely to be a big demand, whilst the taste for Rhodesian cigarettes seems to be constantly increasing. The market for lower grades, however, may suffer, and thus affect the general average price. For this reason our efforts are directed to instructing farmers how to produce the best quality, which can be relied on to sell on its own merits. Crops of a tropical character are grown as yet to but a small extent, though, as the lower and more distant portions of the Territory come to be occupied, more and more attention must be paid to them. The cultivation of coffee is extending in Melsetter. Our one rubber plantation there is producing that valuable commodity of good quality; whilst the experimental planting of tea continues. Cotton also is being experimentally grown, but no definite opinion can yet be ventured on the prospects with regard to it. Mangoes are being very successfully grown on our eastern border, where the climatic conditions are evidently very suitable.

The higher standard of living, which has in the past been alluded to as an indication of general prosperity, is fully maintained and is evident everywhere, including the more remote districts, such as Melsetter and Victoria. The indications of

improvement and progress are numerous. There was, despite the drought, an active demand for stock of all kinds, and both ordinary foundation cows and high-class stud stock were eagerly sought after. In this connection an interesting return from the annual statement of the South African Customs Union gives the importations of agricultural machinery and of articles for use in agriculture into Southern Rhodesia during the past five years :—

Year.		Articles for use in Agriculture.	Agricultural Machinery..
1908	...	£21,366	£2,571
1909	...	27,530	3,350
1910	...	35,310	5,669
1911	...	35,810	9,033
1912	...	46,610	5,398

From these figures we may fairly infer that the agricultural industry has during that time more than doubled itself. That machinery for agricultural purposes shews a decline during the last year is attributable rather to the excessive rise in 1911 than any actual diminution of demand, and this figure also is well over double that of five years ago. Of the items included under those "in use in agriculture," importation of farm implements has risen in five years from a value of £16,599 to £29,268, dip from £837 to £2,075, whilst fertilisers have increased over tenfold from £854 to £8,713. These figures tell their own tale, and are a fair indication of the rise of the agricultural industry and a measure of the rate of its expansion.

There has been a steady increase in the number of farmers coming in from the south and from oversea, whilst an encouraging sign is that mining men in many instances are investing in farms and establishing themselves permanently on the land and becoming identified with its interests. Of late a number of persons with means, more than was previously the case, have come to Rhodesia and bought farms. To such settlers Rhodesia at present offers more favourable opportunities than to men of limited means, and perhaps a better return on their capital than can be offered by any other British possession. Young men from oversea and from the south, anxious to make their way, still form the major portion of the settlers, whilst there is also a small contingent who seek to make a living by transport riding and by means of trading and hunting. While beginners are numerous, it is satisfactory to observe that the

failures are few, and that farming is now generally recognised to be a safe, as well as a profitable investment—to provide a livelihood and a competence, if not a fortune—and that its pristine speculative character is giving place to normal industrial conditions. A number of partially developed farms changed hands during the year, the purchasers being apparently as prepared to pay for improvements as the original holders are willing to realise their profit and strike out afresh further afield. This is a good sign, as the newcomer with capital is able to step into a holding already in a productive condition, whilst the old hand with several years of experience is better able than the stranger to take up new land and make it into a farm. The prices paid in such cases for partially developed farms are most encouraging, and shew clearly that land is beginning in Rhodesia to possess an actual market value and not a mere speculative or nominal one.

A tendency has been shewn among the large land-owning companies to require rents from native tenants to be paid, not *per capita* as in the past, but on the basis of the stock grazed or other use made of the land, with the result that the natives prefer to shift from such farms and withdraw to their own reserves. From the point of view of effective development of such land and control of diseases of live stock, this step is to be welcomed. At present there is an undue congestion of cattle and sheep in certain regions, and much of the suffering and loss during the recent drought in portions of Matabeleland is attributable to the overstocking of such farms. The native reserves are ample for their purpose, and it is to be hoped that the transference of native stock into areas originally set apart for them may lead to more uniform distribution of cattle throughout the country, and tend towards the occupation by European settlers of those parts of the country intended for them.

For the present, our difficulties in regard to farm labour are over, though the supply is by no means superabundant, and it would be premature to say that they were altogether past; still, the fact that local boys are working on the farms and finding out the advantages accruing therefrom cannot but prove a permanent benefit. The difficulty of the new settler in obtaining local boys to work has been largely a matter of mutual ignorance in the past, natives being suspicious of strangers and new-comers not knowing their language. The drought

will not be without its compensations if it brings the native out of his abundant ease, and familiarises him more with the profitability, if not the dignity, of labour. Throughout the year the supply of farm labour was much more plentiful than in 1911, but the fact remains that without the northern boys it would have been entirely inadequate.

The annual losses of stock owing to veld fires is a severe burden both on the white farmer and on natives. Not only is the character of the veld and soil influenced by the continuous destruction of organic matter and herbage, but the rain tends to beat the surface of the ground hard and to run off instead of being absorbed. This torrential flow carries with it the fine earth, and so commences the process of denudation of which the final stages may be seen in other parts of South Africa. The grass is destroyed in the dry time just when it is most wanted, both for this protective mechanical effect and as food for stock. The consequent impoverishment of all cattle, the death of many, the lack of milk for calves, the encouragement of inedible bush and coarse grass in place of fine pasture, and the appearance of poisonous plants on the burnt veld when there is no other green thing around, are results apparent all over the country. Many farms were completely burnt out, and movement to other veld became necessary. The trouble is general, and with increase in stock and in the number of farms it is becoming more severely felt year by year, especially in such a year as the past. It is exceedingly difficult to apprehend persons setting the veld alight. The chief offenders are natives, travellers, prospectors and sportsmen. The whole subject has been receiving earnest consideration, with a view to securing, if necessary by legislation, some measure of protection of the veld during the dry season.

The proposed creamery at Gwelo is in course of construction and will soon be an established fact, but already the assurance given of its establishment is having a visible effect. It is necessary to look far ahead in the purchase of heifers and of bulls of milking strains, whilst farm management has to be adapted in advance for the provision of succulent winter feed during the dry months when milk is most scarce. The ready money which will be brought into circulation through the monthly payments made by the creamery is a specially attractive feature, which will have many beneficial results. The

Department is bringing to the notice of farmers actively the value and uses of a butter factory, and stimulating the interest therein so as to secure at as early a date as possible a large supply of cream. This must naturally take some time to accomplish, as the necessary dairy cattle have largely to be obtained from the south in the form of heifers under two years of age, which will not be in profit for a year or more after arrival. It is realised that such a pioneer venture cannot from the outset prove profitable, and that the dairy industry has yet to be developed to provide the cream necessary. Without the factory to take whatever cream may be obtainable, dairy farming at any distance from towns would have had to follow the old-fashioned system of the domestic churn with all its associated drawbacks, whereas now there is an opportunity of conducting the business on modern lines, producing the milk at distant points, separating on the farm and despatching the cream to a central factory, where it will be paid for on the basis of actual butter fat supplied. Much interest is being evinced in the project, and a number of farmers are preparing as soon as possible to produce the necessary cream and to make use of the butter factory when once it is established.

The establishment of the Land Bank is of great significance to the farming community. The effect of this inflow of capital, and its application directly to the farming industry, must have an immediate effect and be of great ultimate good to the country. The Land Bank is an attraction to the new settler, but the man who has been some time on his holding is in a position especially to benefit from it. Money can best be employed in developing the resources when its potentialities have been fully realised, when, for instance, the possibilities of irrigation or the prospects for crop production or dairying have been ascertained and the markets tested. The proof of good faith is furnished by the fact that into these undertakings the farmer throws his time and energies, and often his all. The capital is at once productively and advantageously employed on projects which have the merit of being applied under conditions familiar to the borrower. It should be pointed out that the good effects of the operations of the Land Bank must not be looked for immediately, but that time must be given for the funds obtained to be expended, and then again for the resultant returns to accrue.

The live stock of the country has certainly suffered from the unfavourable season. The drought, generally, was less damaging to crops than to stock, but round Bulawayo and south and east from there the shortage of grazing and water was acute, and led to a considerable mortality. This loss was variously estimated by the public up to 30,000 and even 36,000 head. The actual figures can never be ascertained, on account of the objection of natives, and even of many Europeans, to the counting of their stock. Careful enquiries, however, made through the Police, the Native and Veterinary Departments, furnish as close an estimate as can be formed, and probably as accurate as would be obtained by any formal enumeration. The returns shew the loss at about 7,689 head, and there is every reason to believe this to be the full extent of the mortality. The death-rate of stock, apart from drought and outbreaks of contagious disease, is, generally speaking, remarkably low, and reports received from all parts of the country emphasise this fact. The increase is steady, and, in comparison to other countries, remarkably rapid. The total number of cattle in the country now approximate, on a conservative estimate, close on 600,000 head, of which 350,000 are in the hands of the natives. The improvement in regard to stock is not confined to numbers only, but strenuous efforts are being made to improve the quality by introducing blood of European breeds to grade up our native foundation stock. There is a keen demand for any kind of breeding stock, and new-comers find some difficulty in starting a herd. This, aided by the drought, has led to brisk trading of cattle from the natives, whilst the few farmers who have cattle for disposal are shewing an inclination to make use of periodical stock sales at convenient centres—a new factor of much significance. A new feature in this connection is that several ranching companies have been formed during the year, and these and others are embarking upon operations on a large scale, notably the British South Africa Company, at Rhodesdale; Liebig's Extract of Meat Company, at West Nicholson; the Rhodesia Cattle and Land Company, Limited, at Gwanda; Messrs. Chambers and Plant, at Ndanga; The Makorsi River Ranching Company, at Victoria; the Anglo-French Company, near Gwelo; Matabeleland Ranching Company, near Selukwe; and De Beers Consolidated Mines, Limited, at Shangani.

The tendency to supply more completely our own meat requirements, referred to last year, is even more clearly demonstrated now. The importation of meat of all sorts, including certain items such as rabbits and potted luxuries which cannot be obtained here, but excluding fish, during the last three years is as shewn :—

Year.		Pounds.		Value.
1910	...	2,844,212	...	£67,601
1911	...	2,241,199	...	£59,655
1912	...	1,705,405	...	£48,571

This trend, which was forecasted, is the more satisfactory in view of the drought which has restricted local supplies. A less pleasing feature, however, is the continuance of unjustifiably high prices for fresh beef and mutton, especially to the urban consumer.

A careful revision of the regulations governing the movement of cattle in general, as distinct from the question of ox-transport, has also been undertaken during the year. The control of such movements has in large measure, and under adequate safeguards, been deputed to the District Veterinary Surgeons, whereby matters, concerning which local knowledge is essential, are dealt with on the spot, and the head office relieved of unnecessary detail. The general principles regarding movement of cattle have been maintained, and it is recognised that our comparative immunity from contagious diseases of cattle and prompt suppression of outbreaks is in large measure due to these regulations. At the same time, measures have been adopted to minimise the hardships connected with the imposition of quarantine, and to this end a discrimination is made between areas of active infection and guard areas surrounding those in which, whilst there is no disease yet, the strictest precautionary measures are employed. These revised regulations operate smoothly. The illicit introduction of cattle into Rhodesia is a source of grave anxiety. All cattle entering the country without the necessary permit are shot at sight by the police, and the numbers dealt with in this way are considerable. The employment of native detectives has been helpful in tracing offences, and no doubt in discouraging the practice. The heaviness of the penalty appears to have weighed more on the mind of the jury than the gravity of the offence, whilst the crime itself is not brought home to

the responsible party if performed by servants acting under orders. African Coast Fever is still active in the Northern Transvaal, whilst a serious danger threatens the country on account of the presence of pleuro-pneumonia near our border, in Bechuanaland and the Tati Concession. Rhodesia has been free from lung-sickness amongst cattle for eight years, and if introduced it is for that reason likely to spread with special rapidity and cause severe loss. The position is a serious one, and the danger is foreseen and can be guarded against. One measure for our protection, not by itself alone effective, but a very material assistance if coupled with adequate police patrols and the employment of native detectives, has been the erection of a fence along our entire boundary with the Tati Concession, the completion of the last section of which, to the junction of the Shashi and Ramaquabane Rivers, is now in progress. Not only does it minimise the hardship of stray cattle from the Tati being destroyed, but it prevents cattle from our side crossing also, and so mixing with or traversing the same veld as Tati stock. Further, it serves as a constant reminder of the sanctity of the frontier, and enables attempts to run cattle to be discovered by the signs left where the fence has been tampered with.

As a protection against the introduction of disease, an arrangement has been made with the Union authorities for the maintenance of a strip of territory along our mutual boundary, the Shashi and Limpopo Rivers, clear of all cattle, for a width of 20 miles on each side of the border. Any cattle found within this proscribed area on our side are shot. Owing, however, to the exceptional season this year, and the scarcity of water in the higher country, it has been found necessary temporarily to suspend this arrangement, and to admit cattle the property of natives and Europeans into the proscribed area. After next rains begin it is hoped that this protective measure may be re-imposed.

The need of good bulls in Rhodesia is very great; indeed it is to-day the most urgent requirement of the pastoral industry. The numbers of breeding stock in the country are at the moment relatively few to what in the space of a very few years they may be expected to reach. It is, therefore, possible with a comparatively small number of pure-bred bulls now to influence a far greater proportion of the future cattle of the

country than will be the case in a few years' time. If active steps are not taken, and if, for want of an adequate number of pure-bred bulls, so many native, Africander and cross-bred nondescript animals continue to be used, there will be comparatively little improvement in our stock, and any importations at a later date will have relatively a much smaller effect than if they can be procured now. We stand, therefore, at a critical juncture, and it is necessary to use every effort to obtain good blood now, so as to influence a large percentage of the future breeding stock of the country. From the north it is at present difficult to admit any cattle owing to the uncertainty concerning safe routes. The investigation of trypanosomiasis is being pressed on, but meantime a policy of extreme caution is advocated. The comparative freedom of Rhodesia from diseases of stock renders it inadvisable for us to import cattle from Bechuanaland, the Transvaal, Portuguese East Africa, Natal, and the eastern portion of the Cape Province, hence our South African sources of supply are restricted to the Free State and part of the Cape. Owing to the outbreak of epizootic aptha, importation from Western Europe and the British Isles was for several months prohibited. It is unfortunate that, at a time when there is a growing demand for cattle, both stud stock and ordinary commercial cattle should be so scarce and dear. To meet these obstacles and to provide against possible future difficulties if, as is not unlikely, foot and mouth disease should break out again at Home, the Administration instituted enquiries into the possibilities of procuring cattle from Australia, more particularly from Queensland, which, like Rhodesia, is a redwater country. To this end it was decided that the Director of Agriculture should make a personal visit to Australia to ascertain what were the prospects of procuring stock there suitable for stud purposes or for increasing our breeding herds. The information previously obtained on these points was very conflicting. A separate report on the result of these enquiries has been published, in order to give all interested an opportunity of studying the facts before any action is taken.

In spite of the restrictions referred to, there has been a greatly increased importation of cattle this year, much beyond previous seasons, a demand which is apparently rapidly growing. Confidence as regards cattle disease, settlement of the country, prosperity amongst the farmers, and appreciation of the great possibilities of Rhodesia as a cattle country, are all

tending to produce this effect. Since the 1st of January there have been imported into Rhodesia 244 bulls and 3,810 heifers, the former mostly of pure-bred Friesland, Shorthorn, Devon, Hereford and Africander, the latter chiefly grade Shorthorns and Frieslands. From overseas there have been brought in 71 bulls, 27 heifers and 22 cows, all pure-bred pedigreed stock. The total importation of breeding stock during twelve months is 4,054 head. A satisfactory sign of individual enterprise is that the European importations were carried out largely by private persons without recourse to the assistance of the Department, except as regards inoculation against redwater and gall-sickness. In a few instances this precautionary measure has been dispensed with, with fatal consequences. The chief importers have been the Liebig's Extract of Meat Company, with 26 head of Sussex and Aberdeen Angus; the Central Estates, with 12 Shorthorns; Mr. Glanfield, 10 Sussex; De Beers, Ltd., 6 Sussex bulls. Mention must also be made of a Friesland bull from America, imported by Mr. A. J. Maclaurin, the highest priced beast ever brought to Rhodesia. Another notable importation was that of the Commercial Branch of the British South Africa Company of 44 Shorthorns for the Rhodesdale Estate. The mortality on inoculation of this lot was particularly severe, and separate reports on the subject have been submitted. The type, age and condition of the animals brought out was not such as to render successful inoculation probable. Following on the successful importation from England and distribution of bulls in 1911, steps were taken early in the year to repeat the undertaking on a larger scale. There was a ready demand, and 70 bulls and heifers were ordered, but within a couple of days of despatch export was forbidden, on account of the unfortunate outbreak of foot and mouth disease at Home. The returns of importation of live stock other than cattle are interesting. All equines are subjected to the mallein test, and the numbers imported are therefore easily checked. There were 800 horses, 937 mules and 2,184 donkeys introduced, as against, respectively, 1,587 horses, 2,759 mules and 2,785 donkeys last year. The diminution is probably due to the absence of horse-sickness in 1912, whilst, with the decrease of Coast Fever, cattle are being more largely used in defined ox transport areas, and in part no doubt to the depressing effects of the drought. Goats and sheep to the number of 63,578 were imported, as against 59,564 last year. These are required chiefly

for slaughter, for the Department purchased 109 pure-bred sheep for stud purposes, partly for the Gwebi farm and partly on behalf of farmers. Pigs were imported to the number of 194, mainly for breeding purposes, and 72 ostriches came up from the south.

In his annual report the Chief Veterinary Surgeon refers particularly to the value of the practice of dipping all stock on the farm, for the purpose of eradicating the tick and with it most of the disease of cattle. Dipping also removes one of the chief causes of poverty, for, quite apart from its potentiality of conveying disease, the tick as a mere blood-sucker and annoyance to stock is a great source of loss. The grant of £50 towards the erection of a tank has proved a great encouragement and boon, and led to the construction of many which would not otherwise have been built. The grant is not to be regarded as a dole, since benefits accrue not only to the individual but to the community at large, owing to the increased security afforded against the occurrence or spread of disease. The realisation of the benefits of dipping is shewn by the fact that during the year under report the number of tanks in the Territory has increased by upwards of 100, and the number in Rhodesia to-day stands at 325. The presence of these tanks, coupled with the extension of fencing, is rendering the position of the country with respect to stock disease very different from what it formerly was, both as regards the probability of outbreaks and the spread of disease. Dipping material is, with the increase in tanks, becoming an article of constant and growing demand, and its cost a consideration. As a result of representations, the railways have reduced the tariff from Beira. A new preparation, made by Messrs. Cooper and Nephews, has lately been placed on the market, and is, by arrangement, sold to farmers for cash through District Veterinary Surgeons at a lower rate than it is procurable through the stores. Besides the economy effected, this dip has the advantage of rendering almost impossible accidents in use, such as are not infrequent when arsenite of soda is employed.

Common observation shews that the poultry industry is extraordinarily neglected in Rhodesia; personal knowledge bears this out, and official reports confirm the opinion. The quality of local poultry on the market is poor, and prices absurdly high. The treatment accorded is

usually of the most casual nature, but where care is given, and there are a few instances of this, good results are obtained. The total amount, according to Customs returns, and values paid to other countries for poultry of all sorts, alive and dead, and for eggs, in 1912 was £19,080. Importation of live poultry, chiefly for the table, amounted to £6,012, of which by far the larger proportion, £5,562, goes to the Union. Eggs to the number of 2,261,792, valued at £11,808, were imported, as against 1,940,166, valued at £10,405, the previous year, which in turn was an increase over the year before that. These eggs for the most part come from the Union, only 20 dozen from Portuguese East Africa, and considerable consignments from Holland, France, Denmark, Russia, Austria, Hungary and the United Kingdom. Dead poultry of all sorts, though not a large item, shews a big increase over the previous year—31,861 pounds, valued at £1,260, in 1912, and 23,160 pounds, valued at £830, in 1911. This is brought from most of the same countries as the eggs, but from Norway and China in addition, whilst over half the total is from Australia. That it should be possible to sell produce of this kind from the ends of the earth—Norway, China and Australia—at our doors in competition with the local article is a very grave reflection on our abilities, methods and enterprise. It is little less than a disgrace that these figures should be increasing as they are, and that even densely peopled countries like France, England and Holland should be able to compete with us in our own markets. The drawbacks to poultry keeping in Rhodesia are not greater than elsewhere, nor do they justify the neglect shewn to a remunerative side line possible of extension on practically every farm in the Territory.

The position of the country as regards disease of stock cannot be regarded as otherwise than most satisfactory. The steady decline of the number of outbreaks and of losses through African Coast Fever warrants the feeling that this long-dreaded scourge has now been completely got under control. Judging from the past, recurrences are only to be expected, but, if properly and promptly dealt with, they need cause no more than a quite insignificant loss, as is shewn in several recent instances where only one or two cases occurred—surely a very remarkable record for a disease well known to be so highly contagious in its nature. The position to-day justifies the policy pursued, and inspires confidence for the future.

The occurrence is recorded of a single case of pleuropneumonia, after a number of years of entire immunity, located close to the Tati border, in a neighbourhood constantly viewed with suspicion, on account of the possibility of illicit introduction of cattle from outside. Fortunately, further spread has been prevented, and there is no cause for further apprehension.

The general health of stock is otherwise very good, and quite belies the evil reputation gained in past years. The unfortunate death-roll this year due to the drought is altogether adventitious, and, considering the scarcity of grass and water, is remarkably low. The successful limitation of diseases of stock cannot but be attributed in large measure to the general efficiency of the Veterinary staff, and the sufficiency of the regulations and precautions enforced. No doubt such restrictions are irksome, and every endeavour is made to render them as little so as is compatible with safety, but it must be recognised that the present satisfactory position in this connection is largely due to these restraints, which on the whole are supported or respected by the public.

The application on arrival of the tuberculin test to oversea importations has proved itself a necessary precaution, in spite of the test being applied before shipment, and during the year several valuable animals have been found to be affected, and accordingly were destroyed. Fortunately this disease has as yet no foothold in Rhodesia.

Ephemeral fever, known also as "three-day sickness," has again appeared and swept over the sub-continent, including Rhodesia, causing little mortality, although affecting many animals, and remaining, as regards its origin and spread, a mystery. Fortunately this curious transitory ailment is seldom fatal and not very serious in its effects.

Horse-sickness has been less than in any year on record hitherto, a fact which may be associated with the unusually dry season, but the nature of this epizootic also remains unexplained and undetected, although the investigations referred to elsewhere hold out good promise of a solution of the problem of preventive inoculation.

Rabies has been in evidence more than usual. The quarantine measures for extirpation of this disease, to be effective,

require the loyal and whole-hearted support and compliance of all owners of dogs, white or black, and there is reason to fear that such is not generally the case, so that the success of the measures employed is neutralised by this apathy.

The highest importance must be attached to the results obtained during the year by the Veterinary Bacteriologist in his investigations into the nature and treatment of diseases of stock at the Veterinary Laboratory, Salisbury. The advances made in our knowledge of piroplasmosis and anaplasmosis, horse-sickness and trypanosomiasis are of primary importance. The study of our obscure diseases of cattle, horses and sheep deserves encouragement, and the success already met with justifies every effort to facilitate further research.

The investigation carried on for some years past with a view to conferring protection to horses against horse-sickness has lately made considerable progress, and a number of experimental animals have been successfully immunised. Five horses fortified by the Bacteriologist and one untreated horse were tested by the Chief Veterinary Surgeon, who inoculated them with virulent horse-sickness blood. The control horse died of typical horse-sickness, whilst the others remained unaffected and shewed no clinical nor thermal reaction whatever. The result of this test is very encouraging, inasmuch as it points to the correctness of the principles upon which the process is based. At the same time it must be understood that much experimental work has yet to be performed in standardising and preparing in bulk protective material before the method can be applied on a large scale. The process remains to be perfected, but there is good reason to hope that, as the outcome of these researches, the immunisation of horses may ere long become as general as that now in common use for mules, in which case horses will be kept much more freely than is the case to-day, and horse farming will be added to the industries of Rhodesia.

The formation of an Animal Industries Branch of the Department has filled a manifest want in its organisation, and added materially to the effectiveness of its services to the farming community. It was anomalous that, whilst diseases of stock received very full attention, there was in the past no branch of the Department directly concerned in stimulating

the live stock industry as such, particularly in matters connected with the breeding and care of cattle, sheep, pigs and poultry and the dairy industry. This deficiency has now been rectified, and already good results are accruing. Before entering on the duties of his appointment, the officer in charge of this branch took occasion to familiarise himself with the latest advances in the bacon-curing industry on factory lines in England and Ireland, and he also made some study of the markets from which stud stock might be obtained at Home. There is great room for development of departmental work in the direction of disseminating information amongst farmers regarding the breeding, rearing and handling of stock, in butter and cheese making, and treatment of cream to be sent to the butter factory, and in pig and poultry keeping, and in developing markets for these forms of produce. It can only be considered that a small commencement has been made, and much remains to be done when the necessary staff can be provided.

An important feature of the work of the branch is the purchase for farmers, on favourable terms, of breeding stock in the Cape and Free State or from Home. This has been carried on with very gratifying success, and the popularity of the system is assured. The appearance of foot and mouth disease in England gave that side of the undertaking an unfortunate set-back, but for which a considerable importation from overseas would have taken place. The spread of Coast Fever into the eastern portion of the Cape Province has restricted the area from which South African-bred stock could be drawn. In spite of these misfortunes, there has been an increased demand for stock purchased through the Department, the actual numbers for the year being 39 bulls, 382 heifers, 11 pigs and 6 sheep, at a total cost to the buyers of £7,152, as against 28 bulls, 8 heifers, 63 pigs, 53 sheep and 1 jack donkey, costing £1,149, last year before the branch was separately established. The total value of stock purchased since the initiation of this scheme for farmers is £11,497. Whilst nothing in the way of a stud farm can be said yet to exist, the presence of a limited number of pure Shorthorns on the Gwebi Experiment Farm, a few Large Black pigs and a thriving flock of merino sheep may be regarded as a humble beginning towards this end. Besides demonstrating the feasibility of keeping a small flock on a mixed farm, a number of young rams have already been dis-

tributed at the moderate price of £4 each. Here, too, there are great possibilities of useful development of the work of the Department.

A mass of experimental work has been conducted at the laboratories and on the Government farms, and in conjunction with private farmers all over the country. These experiments, now dating back for four years, furnish a fund of knowledge out of which general principles are beginning to emerge, and upon which practical recommendations may be based. This method of accumulating facts is slow, and demands patience and application, but furnishes the only sure foundation for progress in arable farming, where one step each year is all that nature permits. The field to be traversed is broad, but it may now be claimed that a fair start has been made, and that a rich reward is assured if we persevere along the lines of research already commenced. Expansion of the work is obviously desirable, and is limited only by the means available.

The experiment farms, although as yet far from fully equipped, are serving a very useful purpose. The breaking of land, fencing, building, stocking and the experimentation have to proceed concurrently, and it must be some time before the Gwebi and the Longila farms can be said to be in full working order. Later, as settlement advances, other such stations will be required in other climatic zones; meantime two distinct types of country, the red soil and the granite, are provided for, and in the centre of each of the Provinces of Mashonaland and Matabeleland. Experiment farms are the recognised means of acquiring and distributing agricultural information in other British possessions, as well as in all the leading agricultural countries of Europe, and the advances made in this direction in Rhodesia only correspond with similar efforts elsewhere, and, in fact, still leave much to be desired in the way of equipment and development. "On the experiment farms are grown new crops not yet generally known, cultivated on such a scale as to be freed of all suspicion of being plots specially well treated. Amongst these thus demonstrated to be practicable commercial propositions may be mentioned linseed, velvet bean, teff grass, buckwheat, paspalum and chicory. In addition to the purely experimental work, it has been thought desirable to utilise the Gwebi farm for the benefit of farmers by producing reliable seed of the best

possible quality. By means of systematic selection over four seasons, pure varieties of maize, of what may be termed pedigree strains, are now available, and these are distributed to farmers at a low price. The demand exceeds the supply, for necessarily seed of this quality is limited. Teff grass seed is also being grown and distributed.

An experiment farm for the study of the problems of the granite veld has been established at a central situation in Matabeleland at Longila, near Lochard Siding, on the main line of railway between Bulawayo and Gwelo. The ground chosen is characteristic of a very large section of the country, typical granitic sand, not exceptionally fertile, high lying and somewhat exposed, undulating and well watered. A commencement has been made in the cultivation of a large variety of crops with the object of increasing the scope of arable farming on light soil, paying special attention to the growth of winter cereals on naturally damp unirrigated land, to tobacco, ground nuts, fodder crops and artificial pasture. Owing to the unprecedented dry season, operations have been much hampered. Necessarily some time must elapse before this experiment farm can shew much result, for the land, when first occupied, was bare veld without improvements of any kind.

At the Botanical Experiment Station at Salisbury a different class of work is conducted. A very large number of possible crops and usually many varieties of each are tested in a preliminary way to ascertain their potential value, and in order that by close observation some opinion may be formed of their possibilities for Rhodesia. Such as give promise of success are further tested on a field scale on the experiment farms, before being actively introduced to the attention of farmers and recommended as new crops. In this way disappointments are avoided and local experience gained, from which recommendations may be made. The station at Salisbury thus partakes of the nature of an out-of-doors laboratory and trial grounds. In addition, the herbarium and seed distribution stores are located here, also the forest tree nursery, which is now being transferred to a new site.

The distribution of seed to farmers of crops new to the country, or of new varieties of well-known crops, has been continued, with the object of introducing novelties to their

attention, and adding variety to the products of the country. Whilst no doubt achieving this object, it is to be regretted that so many experimenters neglect to furnish reports, from the compilation of which, if secured in large numbers, general conclusions might be drawn as to the spread and prospects of such introductions. The fact undoubtedly remains, however, that in this respect a great change is taking place, and that the variety of crops grown on farms is rapidly extending, and the idea and practice of a rotation is gaining ground, a step forward, the importance of which is of the greatest moment and most far-reaching consequence.

Wheat has hitherto been regarded as a crop to be grown only during the dry winter months, either under irrigation or on naturally moist vleis. Since 1910 the Agriculturist and Botanist has been experimenting with a view to growing rust-resistant varieties in the rainy season, and also endeavouring by cross-fertilisation to propagate new varieties. Several sorts give good promise of success, particularly one known as Victoria wheat from the Transvaal, which, during three consecutive seasons, has given fair returns, whilst other varieties alongside have been destroyed by rust. Victoria wheat is now being introduced on a large scale, and there is every prospect of a considerable quantity being grown in the future. Irrigation is a costly mode of producing wheat. Under rainfall in summer not only is wheat grown more cheaply, but it also forms a valuable rotation crop, and one which, unlike maize and tobacco, needs no cultivation or attention from sowing time till harvest. If an adequate local wheat supply can be assured, as there is now no reason to doubt, a great stride has been made in the cheapening of living in Rhodesia.

The progress of the work of the Entomologist's branch during the year is highly satisfactory. The tsetse fly areas of Rhodesia continue under observation, and so far no serious spread has been observed. From information dating prior to rinderpest, it is evident that the present distribution of the fly is very much more limited than was at one time the case, and in the occupied area of the country tsetse only occurs in the Hartley mining district, and here it does not seem to be spreading, but rather the reverse. In addition to research and advice, the Entomologist has assisted in finding a fly-free route between Feira, on the Zambesi, and the occupied parts of the

Territory. Particular attention has been given to the study of insects injurious to tobacco, and the life histories of a number of pests worked out.

The labours of the Chemist in the elucidation of agricultural problems do not come perhaps so prominently before the public as do the activities of other branches, but they are none the less important on that account. The study of the fertility of soils, the demonstration of the presence of poison in the case of obscure causes of death in stock, the manuring of soils, the determination of the composition of farm foods, fertilisers, cave guano and lime deposits and other kindred matters have been solved or furthered by the Chemist's branch. A prolonged examination of the maize plant was conducted to ascertain the sugar content, in view of certain pronouncements made in America with regard to the preparation of sugar, paper pulp, and alcohol from that source. No definite result has yet been reached in regard to the complete utilisation of leaf and stalk, as well as grain of maize, but the subject is one deserving of watchful attention. The results of a series of experiments in manuring maize, conducted at the Gwebi farm, in which even at present prices of fertiliser, and with grain at one-half the current rates, a profit was shewn, have evoked much interest, and called attention to the possibility of applying artificial fertilisers with advantage to other crops besides tobacco, to which it has hitherto almost exclusively been applied.

The number of schemes surveyed by the Agricultural Engineer since his appointment is now very large, and, as they come into existence and use, must augment materially the prosperity of the farming community. Even a small piece of irrigable land increases very much the potentialities of a farm, it adds to the range of crops, creates possibilities of dairy farming, and renders market gardening for towns and mines and fruit-growing safe and profitable undertakings.

The services of the Tobacco Expert have been in great demand for the purpose of instructing our numerous beginners in the treatment of the crop and in curing the leaf, whilst experienced growers also constantly seek his advice in their difficulties, and he has been kept busy throughout the whole year.

The first great task of the Veterinary staff is the suppression of contagious epizootic disease, yet when not engaged on this work their services are made available to the public at a low tariff, charged, not with a view to earning revenue, but as a preventive of abuse of the privileges, and to secure that those benefiting shall at least contribute a fee directly, if only in part. Similarly, whilst the services of the Veterinary Bacteriologist are at the disposal of all requiring help, particularly in regard to preventive inoculation and treatment of endemic diseases, yet a charge is made for the materials used, for the virus redwater and gall-sickness and blue-tongue, for solution of trypan-blue and for the specific remedial injection for fly diseases of cattle.

A commencement with regard to lectures to farmers was actively made in the month of May, and the appreciation of the effort has proved most encouraging, the requests for the presence of the experts and for addresses by them at farmers' meetings being beyond our powers to meet. During the year lectures have been delivered to audiences ranging, as a rule, between 20 and 30 by the technical officers and the Director of Agriculture at the following centres:—Bulawayo, Gwelo, Lalapansi, Hartley, Gatooma, Makwiro, Salisbury, Lomagundi, Enterprise, Headlands, Macheke, Umtali, Melsetter. A series of demonstrations were given at the laboratories in Salisbury to older boys from the schools, intended to awaken in them an interest in farming matters, and develop any latent inclination in that direction at that critical stage of a boy's career when he has, in his inexperience and ignorance, to elect what calling he shall pursue through life. The encouragement given to these preliminary efforts warranted the hope that a short systematic course of lectures would be appreciated and receive support, and arrangements to this end were accordingly made. During three weeks in August a series of 60 lectures were delivered by 10 members of the Department, and a number of excursions to farms and other places of agricultural interest were arranged. A large number of farmers and prospective farmers attended, 25 followed the entire course, whilst many others came to hear particular subjects discussed. At the end, examinations were held, wherein the students shewed a very gratifying standard of proficiency. The experiment has proved an entire success, and

demonstrates that a genuine desire exists for instruction of this sort, and that there is ample justification for expanding the activities of the Department in this direction.

The desirability of providing systematic practical and theoretical instruction has been under consideration, and proposals were formulated and submitted for the establishment of a school of agriculture in Rhodesia.

From the above remarks it will be gathered that the work of the technical branches of the Department has made steady progress in many directions during the period under review. The specialists engaged on these investigations are also occupied in giving advice to farmers, either verbally or by letter, and in travelling over the country so as to make the acquaintance personally of the farmers, and to become familiar with the natural and economic conditions of the country. Full time, therefore, cannot be devoted to the experimental work, and whilst on the one hand this is a matter of regret, yet on the other it is realised that the services of these experts are being turned to practical advantage by direct contact with those who actually and urgently require them. The desire for information, and the ready utilisation of advice offered, is one of the most noticeable traits of the Rhodesian farmer, and encourages the Department to fresh exertions to increase our knowledge, and to reach those who are willing and able to apply in practice the results of study in the laboratories and on the experimental plots. In addition to research, all the technical branches devote much attention to consultative duties and to educating farmers with regard to their respective subjects by every means possible: by lectures, demonstrations, correspondence, bulletins and articles, and by personal visits to farms and by tours through the country. The constant activities of a band of skilled workers devoting themselves entirely to the improvement of agriculture is having a marked effect in ways too numerous, and often in themselves too small, to be noticed, yet collectively very apparent in their beneficial effects.

There has been a slight falling off in the number of brands registered during the year. This is probably due to the fact that on the introduction of the three-piece system there was considerable activity in registering, and that the large proportion of owners of stock have secured brands. The total

number of brands now registered in the country is 4,468, of which one-quarter, 1,138, are in the names of native owners. Of the total, considerably over one-half, 2,427, have been registered during the last four years, shewing the rapid growth of the industry, and the growing importance attached to proper indication of ownership.

The application of the Fencing Ordinance (Part I.) to fresh districts, cumbrous as is the process under the present law, has during the year been extended over large areas, including the whole native district of Lomagundi and parts of Hartley and Selukwe. Four years ago this law was not in operation anywhere; last year it had been applied to 8,747 square miles, and now it has been put in force over an area of 23,939 square miles, whilst further extensions are contemplated.

When discussing the importation of live stock, allusion was made to the journey to Australia undertaken by the Director of Agriculture. At the same time a number of other subjects received attention, and the agricultural conditions and practices of these older colonies were studied for the benefit of our less mature experience. Information was collected with regard to the organisation of departments of agriculture in the various States of the Commonwealth on agricultural scientific research and on technical agricultural education. The development of the now enormous dairy industry, under a system of butter factories and State supervision, the bacon industry, the meat packing and refrigerating works, fruit farming and poultry farming, received attention. Reports were also submitted on the prospects of a market for Rhodesian tobacco in Australia, and on conservation of forests by the Government. Attention was given to such subjects as appeared to have a bearing on our future agricultural development, including the questions of cold storage, horse-breeding, labour-saving machinery and implements, and the laws relating to grass fires.

The Dangers and Prevention of Soil Erosion.

By W. MARTIN WATT, Agricultural Engineer.

The remarks in this article may not appeal very strongly to the average farmer in Southern Rhodesia to-day, but it may be pointed out at the outset that, while soil erosion has not yet attained the dimensions it has in arid or semi-arid countries, it is beginning to shew its evil effects in this Territory, and that the present is the time to consider preventive measures. In the years to come neither preventive nor remedial measures may be financially possible, and every owner of land should therefore consider this matter seriously, and endeavour to realise that later it may become a matter of the gravest concern.

Our Rhodesian soils are mainly derived from the decomposition of rocks either *in situ* or from such situations as permit of the decomposed material being transferred by the forces of water and wind. If the rate of decomposition of our rocks were in excess of the rate of the erosion of our soils we would have nothing to fear. But is this the case? Several farmers in Mashonaland have suffered this year, and in one case in the Mazoe Valley a farmer lost 50 acres of excellent soil at one fell swoop as the result of a prolonged and heavy downpour. In this connection a most interesting series of notes has been received from Mr. J. M. Moubray, of Chipoli, Shamva—results of his own personal experience of the dangers of soil erosion in Rhodesia. His notes were of too local a character to be published at present in the *Journal*, but the writer has to acknowledge his indebtedness to them for several valuable suggestions.

Soil erosion is one of many processes of geology. The eroded soil does not leave the surface of our globe, but in most

instances it leaves the farm, and in many cases the Territory, for a new resting-place in the ocean bed, where for many generations it can be of no value. Rivers laden with fertilising silts are daily discharging themselves into the oceans. As an example, I give the following table (Babb. Science, Vol. XXI., p. 343, 1893), which shews the percentage of material carried in suspension by various rivers :—

River	Drainage areas in square miles	Mean annual discharge (in cubic feet) per second	Total tons annually	Ratio of sediment to water by weight	Height in feet of column of sediment with a base of one square mile	Thickness of sediment in inches if spread over drainage area
Potomac ...	11,043	20,160	5,557,250	1 : 3,575	4.0	.00433
Mississippi ...	1,244,000	610,000	406,250,000	1 : 1,500	241.4	.00223
Rio Grande ...	30,000	1,700	3,830,000	1 : 291	2.8	.00116
Uruguay ...	150,000	150,000	14,782,500	1 : 10,000	10.6	.00085
Rhone ...	34,800	65,850	36,000,000	1 : 1,775	31.1	.01075
Po ...	27,100	62,200	67,000,000	1 : 900	59.0	.01139
Danube ...	320,300	315,200	108,000,000	1 : 2,880	93.2	.00354
Nile ...	1,000,000	113,000	54,000,000	1 : 2,050	38.8	.00042
Irrawaddy ...	125,000	475,000	291,430,000	1 : 1,610	209.0	.02005
Mean ...	334,693	201,468	109,649,972	1 : 2,731	76.65	.00614

No statistics have as yet been compiled of the percentage of silt carried by our Rhodesian rivers, but there is no doubt that during the wet season the quantity must be enormous. Many of our occupied farms are on or are near to the watershed of the country, and this fact has an important bearing on the dangers of soil erosion. As an instance, take the large agricultural area in the neighbourhood of Salisbury known as the Gwebi Flats. This is a gently undulating plain on the watershed of the Gwebi River with a very fertile soil overlying the schist formation, which is here interspersed with diorite intrusions. The land is largely devoted to the cultivation of maize, and every year a certain percentage of the soil is carried

away by the rains. Where the ground is under such a crop as maize the erosion is, of course, much greater than would be the case were the natural covering of veld grass left undisturbed. Now, in this stretch, as the soil is eroded, the only source from which it can be replaced is from the decomposition of the underlying rocks, and there is little doubt that the rate of this decomposition is unable to keep pace with the erosion of soil from, particularly, the areas cultivated for maize crops. In the near future very much larger areas will be cultivated than are at present, and consequently the danger will increase unless some remedial method can be adopted. Apart from soil erosion pure and simple, there is another dangerous side of the question, and that is the evil of sluiting. Nearly every farmer has suffered to some extent from this evil, and the loss of soil, coupled with the inconvenience of having his lands cut up by these deep sluits or dongas, is surely worthy of serious attention. Many of the older settlers must have seen instances when valleys which were once a carpet of green grass now shew open gaping wounds, and have seen rivers and streams encroaching more and more upon the fertile soil alongside their banks.

About nine years ago Mr. W. B. Gordon, then Director of Irrigation for the Cape Colony, took this question in hand and it was followed up by his successor in office, Mr. F. E. Kanthack. Mr. Gordon enumerated six causes of sluiting, viz. :—

- (1) The destruction of forests, trees and shrubs by fire or otherwise.
- (2) The practice of grass burning.
- (3) Overstocking.
- (4) The formation of sheep and cattle tracks, especially in the directions converging towards kraals or watering places.
- (5) The formation of roads and construction of railways.
- (6) Herding of sheep and cattle.

To these causes in this country should be added the general methods of cultivation—the cultivation of vleis in which such crops as mealies are grown, which do not bind the surface soil

nor seriously retard the velocity of the storm water running off; and also native footpaths and farm tracks. These causes may occur singly or in conjunction, but I propose to consider them *ad seriatim*.

With regard to the destruction of forests, etc., it might be stated that in one river system of this country, viz., the Mazoe, provision has been made to protect the timber for a certain distance from the banks of the river, and the writer would like to see this regulation applied to all. The roots of the trees about the banks of a river tend to bind the soil and prevent it being carried away seawards. In the flats and ridges away from the rivers the danger is not so obvious, especially as the indigenous grasses generally grow more densely after the trees and bush have been cleared; but there is little question that trees have a good deal to do in the natural conservation of moisture and prevention of rapid run-off. In this connection the remarks contained in a paper read by Mr. V. A. Carlsen, Conservator of Forests, Orange Free State, to the South African Irrigation Congress may prove of interest:—Mr. Carlsen pointed out that forests exercise their influence on wind, temperature, evaporation and precipitation, on the condition, composition and movement of soil, but, above all, on irregular stream flow. Mr. Carlsen contrasted the different effects of grass and forest in reducing the rate of run-off, and this much in favour of the forest, owing to the canopy of trees breaking the force of the rainfall and preventing the rain from mechanically hardening the surface soil. Further, he pointed out that where grass is dense the roots tend to form a dense mass, and so compact the soil as to prevent any but very heavy and continuous rains from penetrating to the sub-soil. In the case of forests, he stated that the rain is conducted firstly from the foliage and stems to the ground, where it encounters a thick layer of humus formed by fallen leaves, pine needles, etc.; and that owing to the fissures formed by the tree roots and to the porous nature of the surface, it can find its way under the most favourable conditions by subterranean crevices to replenish and regulate the supply of water to the springs and streams below. Mr. Carlsen pointed out that the evaporation from a forest soil without leaf mould is 53 per cent. less than from a soil in the open, and that from a forest soil with a full layer of leaf mould is 78 per cent. less than in the open. Mr. Carlsen also pointed

out the value of forests in increasing the rainfall, owing to the fact that they induce a lower temperature in summer, and transmit a certain amount of moisture to the air, thereby attaining the saturation point more readily. He further shewed the value of forests towards checking the great evil of erosion, to which arid and semi-arid countries are so liable, by their effect in checking rapid run-off. A final argument which Mr. Carlsen brought forward was that, in addition to all these benefits, the afforestation of a country, its mountain slopes in particular, is a great national asset.

In the future there is sure to be a great wood famine; the price of industrial timber has increased enormously within the last 20 years, and the writer heartily agrees with Mr. Carlsen on the principles he so ably put forward to the Congress. In doing so he has this Territory particularly in mind, for enormous quantities of indigenous timber are being cut down by miners, natives and others, and next to nothing put in to replace this devastation.

Grass burning is undoubtedly one of the main causes of soil erosion in Southern Rhodesia to-day. The Administration has recently introduced drastic legislation to prevent promiscuous grass burning. When the grass covering is burnt down, the amount and rate of the run-off will obviously be greater, and if greater, will have, owing to the increased velocity, a greater power for furthering the evils of sluiting and erosion.

Overstocking has a similar effect to grass burning, especially if the veld is finally browsed upon by sheep, with the additional disadvantage that, by the continual tramping of the stock, the surface soil is loosened and becomes dusty, and is easily washed away by the first heavy fall of rain.

Cattle and other tracks include game tracks and kaffir paths, as well as tracks made by flocks and herds. Natives and animals have a tendency of walking in single file, and this results in the formation of a single track being cut at a lower level than the veld immediately surrounding it, and, if in steep ground, this leads to serious erosion.

The formation of roads and construction of railways is the most obvious and perhaps the most important cause of sluiting

in Southern Rhodesia to-day. Those who travel by road, whether by wagon, cart or motor, have it forced upon their notice every day, by the jolting of their vehicle, of the necessity for careful steering. It is the general thing, when a road becomes badly cut up, for the traveller to turn out into the veld and start a new track. The old track with its ruts becomes a water course, and in time may develop into a deep sluit. In this connection, the writer has frequently observed that the tendency to make a new track is almost invariably on the up-side of the old one, while, if it was on the down side, the old water-worn track might beneficially act as a catch-water drain. In many of the made roads of this Territory the storm water is passed across the road in narrow hollows, or above obstructing ridges. This concentrates the run-off from each rain to these particular points, and if they are narrow passages, the velocity of the water may be high, and in consequence be capable of doing considerable damage in the way of soil erosion and sluiting. The same applies to railway construction when it is necessary to make provision for the storm water passing under the permanent way at intervals. This also means concentration and greater velocity, with consequently greater power of erosion.

The herding of sheep and cattle is necessary, chiefly owing to the presence of wild animals. By herding, the movements of cattle and sheep are concentrated around the kraals, and the veld in their neighbourhood becomes overgrazed and trampled, forming a dusty mulch, which, in certain circumstances, is very liable to erosion and sluiting.

The methods of cultivation, and especially the cultivation of vleis, has been mentioned as another cause for soil erosion and sluiting.

Let us now consider methods by which the evil of soil erosion and sluiting may be prevented, remedied or mitigated. I will restrict my remarks to such remedies as are likely to prove financially feasible. Taking the seven causes in the same order, the following suggestions are put forward:—

With regard to the destruction of forests, etc., all timber within a certain distance (say, not less than 10 yards) from the banks of all public streams in this country should be pre-

served, and no cutting allowed unless with written permission. Re-afforestation should more than keep pace with the present rate of the denudation of our indigenous timber.

By legislation and private co-operation everything possible should be done to keep the dangerous and pernicious habit of grass-burning within bounds. Under certain circumstances, the burning of the natural veld grass is a necessity, owing to its rank growth, but any such burning should only be carried out under control.

The prevention of overstocking is obvious—do not overstock.

The formation of cattle and other tracks can best be prevented by fencing against wild animals, thereby obviating the kraaling of animals at night, and by providing a large number of watering places scattered about the veld. In this latter connection the writer would point out that there are very few parts of this Territory at which subterranean water cannot be tapped at comparatively shallow depths by means of wells or boreholes. In driving and herding cattle to and from watering places, etc., this should be done, as far as possible, along the contour of the country, and not straight up and down the slopes. If tracks are cut along the contour, they will act more as catch-water drains, and have the effect of checking the velocity of the water running down the slopes. If tracks are permitted to form down the slopes, these are, as remarked before, very liable to become eroded and to develop into sluits.

The prevention of erosion from the formation of roads and construction of railways is in the hands of the authorities concerned. In the case of roads, their width should be defined, and, whenever possible, fenced in. No deviation from this width should be permitted, and should the original track become washed out, it should be repaired and restored to its original condition. Where artificial drainage crossings are made, the storm water should be passed over the road (unless culverts are used) in a flatly dished hollow, and not, as is so commonly met with to-day, in a sharp abrupt trench, which not only concentrates the volume and accentuates the velocity of the storm water, and increases its erosive powers, but also causes much inconvenience to travellers and heavy wear and tear to vehicles and animals.

In railway construction, drainage works are carried out on the upper side of the permanent way, and passed by a culvert through it at convenient intervals. The effect of this is to unnaturally concentrate the storm water running off the veld. If we wish to have railways—and who do not?—this concentration through culverts is an undoubted necessity. But what I would suggest in mitigation of this evil, is that after egress from these culverts the storm water should be guided in expanding and protected fan-shaped openings, so that it reaches the veld in a wide-spreading thin sheet of water, with little or no power of doing damage by erosion and sluiting. At present the water frequently reaches the veld as a narrow torrential stream, with high concentrated powers, to perform the evil which is being discussed in this article.

With regard to the methods of cultivation and the cultivation of vleis, our present staple crops may be said to be maize and tobacco, neither of which crops, owing to the approved methods of planting, can be said to bind the soil. To prevent erosion, it is recommended that farmers plough and cultivate their lands, so far as is possible, along the contour of the stretch under cultivation. By doing so, the tendency will be to prevent the storm water running off their lands from attaining the same uncontrolled velocity which it might attain if the ploughed and cultivated furrows were directly down the slope. Further, where natural vleis and hollows are cultivated under such or similar crops to maize and tobacco, *i.e.*, crops which do not bind the soil, it is recommended that a strip of the indigenous veld growth be left in the hollow itself. This strip will generally be found to have the effect of so retarding the velocity of the storm water as to prevent it cutting a channel, as it very probably would do if the hollow of the vlei were turned over by cultivation. It may truthfully be stated that this is an inconvenience, but surely it is better to be cut off from one land to another by a level strip of grass than to risk being cut off by a deep donga, which may form later on, if proper precautions are not taken in the first instance. To go further, if the grass strip is left, much of the soil from the side slopes that is washed down will be retained by the grass; while, if a donga or sluit took the place of the grass strip, most of this soil would be carried seawards.

Where small sluits exist, the following plants planted in the beds of these sluits might be used to check the evil :— American aloe, paspalum, Kharee thorn, Mauritius thorn, and possibly Rhodes grass, Mauritius hemp, sisal hemp, Port Jackson willow and tamarisk. Most of these plants are binding if planted close together, and have the power of growing through the silt that they catch up. Of the list given, the writer has had practical experience of the beneficial results gained by planting American aloe and paspalum grass.

In reclaiming a sluit, start near its source and work downwards. This does not mean starting high up on a mountain or hill slope, but as near to the source as possible after the sluit has entered arable land.

In conclusion, the writer would be glad to receive any communication from farmers or others in this Territory who have suffered from this evil, and to obtain their opinions as to the causes of the evil, and any remedies they can suggest.

Root Gallworm.

By RUPERT W. JACK, F.E.S., Government Entomologist.

Certain notes were published in the *Journal* a few years ago concerning this pest, but, from enquiries received at the office, it appears that many farmers in Southern Rhodesia are ignorant of the nature of the injuries inflicted by gallworm, and as complaints of injury have been increasingly frequent of late, it would seem to be time a further effort was made to disseminate information on the subject.

Prevention is always better than cure, and in connection with root gallworm this is especially so. The great bulk of the farms in Southern Rhodesia are at present free from this insidious pest, and yet its introduction by any farmer ignorant of the appearance of infested plants, especially seed potatoes, is a very easy matter. When it is realised that the destructive capabilities of gallworm to susceptible crops, especially on irrigated land, are as great as those of the notorious phylloxera to vineyards, the need for keeping a sharp watch will be appreciated. All farmers should read these notes carefully, and especially take the trouble to familiarise themselves with the appearance of potato tubers infested with this particularly noxious pest.

The root gallworm (*Heterodera radicola*), also known as the root knot eelworm, is not an insect, but a *worm* belonging to the order *Nematoda* or thread worms, which includes many of the worms parasitic in the intestinal tracts of animals. It is a very minute creature, and, with the exception of the pregnant female, is indistinguishable by the naked eye in its natural surroundings. The larvæ hatch in the body of the female, who gives up her life in the process of reproduction. They are slender, thread-like creatures about one seventy-fifth of an inch in length. Either voluntarily or through the decay

and breaking down of the tissues of the plant they make their way into the soil. By means of an exsertile spear with which the mouth opening is provided, they penetrate into a root or tuber, being fond of attacking the smaller roots of a plant. In the tissue of the plant they moult and swell, both sexes acting similarly at first; later, however, the male again moults, re-assuming a thread-like form. The female continues to swell, is found and fertilised by a male, and finally becomes globular or flask-shaped, producing a great number of eggs which hatch within her body. About six weeks are said to be required for the life cycle of the female. On cutting open an infested potato tuber the swollen females may be seen embedded in slightly discoloured areas in the tissue. They are white in colour, and appear simply as minute specks. The appearance of the different stages of this worm are shewn in the adjoining plate.

The presence of the worms in the host plants causes the formation of gall-like swellings. In the case of potato tubers, these swellings cause serious disfigurement, spoiling the market value of the crop. They also adversely affect its keeping properties, infested tubers being very subject to destruction by various rots, and really render the tubers unfit for food, although no doubt infested tubers are frequently eaten without the fact being noticed. At the same time few would relish the knowledge that they were eating numerous minute worms with their potatoes. The appearance of an infested tuber is shewn in the plate. The swellings on the roots seriously interfere with the supply of nourishment to the plants, and produce death or stunted growth, according to the degree of infestation and the natural resistance of the plant. A badly-infested plant turns yellow and sickly looking, and if drawn or dug up the characteristic swellings, as shewn on the bean root in the plate, will be seen. In the case of leguminous plants, the swellings may be easily distinguished from nitrogen fixing tubercles, by the fact that they are part of the root itself, whereas the nodules grow out from the sides of the roots. The latter are also confined to the smaller roots of the plant.

PLANTS ATTACKED.—A very wide variety of plants are attacked by root gallworm; in fact, it is an easier matter to list the immune cultivated crops than those which are liable to attack. Practically all plants belonging to the potato, bean,

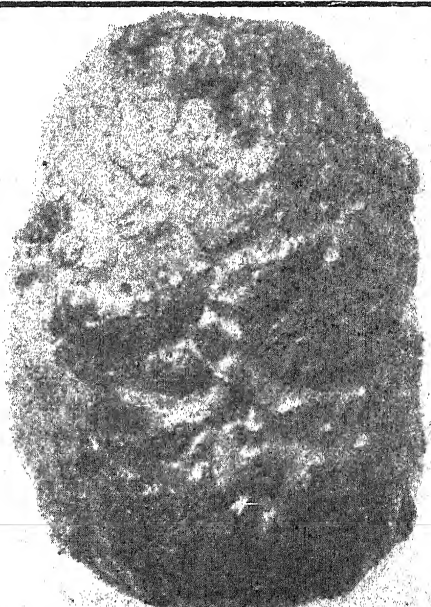
gourd and cabbage families suffer severely. Parsnips, carrots, and beetroot are also susceptible. Vines, plum and other fruit trees are attacked. Maize, the smaller cereals and grasses are little affected.

AGENCIES OF SPREAD.—Root gallworm is one of the many South African pests that have been introduced from overseas. The pest can be carried through the medium of infested nursery stock, such as vines, or of infested seed potatoes. The Government inspection of nurseries aims at preventing the spread of the pest through the medium of nursery stock in South Africa, but undoubtedly seed potatoes form the most potent source of danger. On this account seed potatoes found on inspection at the Rhodesian ports of entry to be infested with this pest are refused admittance to the Territory, but no control can be exercised over the sale of seed potatoes within our borders, and it therefore behoves the farmer to pay attention to the source from which his seed tubers are supplied. South African seed potatoes are very often infested; those from the continent of Europe rarely, and those from the British Isles never, as the pest does not thrive there except under glass. On the farm a variety of agencies tend to spread the pest from one piece of land to another. Such are the mud adhering to agricultural implements and to the boots and feet of labourers and others, farm animals, wild animals, birds, flood water, irrigation water and even, it is said, the wind. Once introduced to suitable soil the pest will flourish as long as host plants in the form of crops or weeds are present for its use; in fact, the soil may be said to be infested indefinitely, for the total eradication of the pest is practically impossible.

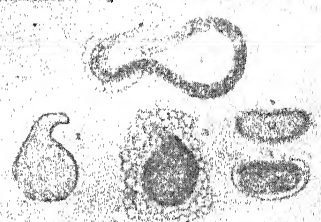
CONTROL MEASURES.—Most of the complaints of injury by gallworm received at the office have been in connection with irrigated land or land naturally moist. It is probable that the long dry season in this Territory is inimicable to the pest, owing to the drying out of the soil to a considerable depth. The obvious course in dealing with irrigated land that has become infested is, therefore, to drain the land thoroughly, and let it dry out over a winter, planting it the next summer to such a crop as maize, teff grass, or other crop little subject to attack. If it is greatly desired to use the irrigable land during the winter, wheat or forage should be grown, followed by maize kept



Root Infested with Gallworm.
Life Size.



Infested Potato Tuber Life Size.



Root Gallworm (*Heterolera radiclella*) Very greatly enlarged
1. Young Worm.
2&3. Females.
4&5. Eggs in different stages of development.

From Miss Ormerod's 1897 Report

Root Gallworm.

very clean, or teff grass in the summer. It is inadvisable to let the land lie fallow over the wet season after the winter crop has been taken off, as the gallworm will increase again on the weeds. Teff grass should be very suitable for reducing gallworm on infested land, as it is an excellent weed eradicator. Maize is little attacked itself, but allows the growth of weeds, and therefore needs thorough cultivation in reference to this pest.

A means of reducing gallworm infestation in cultivated lands which is successfully practised in Europe is the use of trap crops. The time the female takes to mature is taken into consideration in the matter. A susceptible, quickly-germinating crop is sown thickly over the infested ground, and four weeks later is dug or ploughed up, the infested plants being burnt or thoroughly dried out in the sun. It is necessary to dig or plough out the plants. If they are drawn, many of the roots break off and remain in the ground, with the gallworms contained. In badly-infested ground two or three such trap crops are grown in quick succession. By this means the land is rendered sufficiently clean for susceptible crops to be raised successfully for several years. Such measures are only applicable to valuable land of limited extent, and will not appeal to many farmers in this Territory. If the irrigable land on a farm is of very limited extent, however, no doubt such a procedure would be worth while, especially if it is desired to use the land for the purpose of raising vegetables for neighbouring mines, or for growing early potatoes.

Although to some extent effective against other species of plant infesting eelworms, chemicals applied to the soil have proved to be useless against the root gallworm in practicable quantities.

Farmers will be best advised to devote the greatest care and attention to avoiding the introduction of the pest to their lands, and not to rely on controlling the pest after it has gained a footing. If any doubt the need of this, let them ask the opinion of any neighbours who may have been unfortunate enough to add gallworm to their troubles through lack of knowledge or care in the past.

The Animals Diseases Partial Repealing Ordinance, 1913.

A short Ordinance with the above title was introduced during the recent session of the Legislative Council, and carried through without amendment. The primary object was to place pleuro-pneumonia, lungsickness, on the same footing as African Coast Fever, rinderpest and other epizootic diseases. Hitherto special provisions applied to the treatment of the disease, but now these no longer hold good. The original law on the subject was framed when lung-sickness was very common and regarded as enzootic in the country. In a manner altogether unexampled in history, this disease was eradicated from the country by means of the even more acute but non-transient cattle plague, African Coast Fever, and since 1904 it has been practically non-existent in Rhodesia. Unfortunately the same cannot be said of Bechuanaland nor the Union of South Africa, and the possibility of re-introduction always threatens us, necessitating rigid precautions regarding the introduction of cattle from the south, and special measures in the form of fences and policing certain of our boundaries.

To meet present conditions, it was therefore considered expedient, instead of requiring the application of a burdensome, complicated and peculiar system as regards this special disease, to secure that, should it ever unfortunately invade this Territory, it may be treated in the same way as is already familiar to the public in kindred cases. To do this, a necessary step was a brief legislative enactment, now carried out. Opportunity was taken at the same time of amending the main Ordinance on a point on which occasional hardship has been felt, and respecting which there was the possibility of even greater and avoidable grievances being created. Hitherto the meat of animals destroyed compulsorily had to be burnt or buried. In the case of certain diseases this is the proper course, but it is not always so, and discretionary powers are given to Veterinary officers dealing with outbreaks as to the disposal of the carcasses. In this way the unavoidable loss where extreme measures are necessary is somewhat mitigated. Finally, it has been found desirable to extend the jurisdiction of the courts dealing with

breaches of the law, and now, under adequate safeguards, cases may be remitted to the Magistrates for trial, and punishment for offences may be inflicted under the authority of the remittal.

It is perhaps unavoidable that so far-reaching and complex a law as that dealing with the control of disease amongst live stock should from time to time, with changing conditions and with increased experience, require such amendments as have taken place under Ordinance 2 of 1911, and again at this time. Whilst tinkering with the law is to be deprecated, yet it will be conceded that we must keep pace with the times, and introduce improvements wherever and whenever it is found necessary.

The Ordinance reads :—

1. Sections 35 to 51 of the “Animals Diseases Consolidation Ordinance, 1904,” inclusive, being Part IV. of the said Ordinance, are hereby repealed.

2. Sub-sections (3) and (4) of section 13 of the said Ordinance are repealed, and the following sub-sections substituted in lieu thereof :—

(3) The carcases of all animals destroyed under the provisions of this Ordinance or that may have died from any destructive disease shall be disposed of or dealt with in such manner as any official duly authorised thereto by direction of the Administrator shall direct.

(4) Any person failing to comply with, or acting contrary to, any directions given under the preceding sub-section shall be liable upon conviction to a penalty not exceeding £50, or in default of payment to imprisonment with or without hard labour for any period not exceeding three months, unless the penalty be sooner paid.

3. Section 63 of the said Ordinance is hereby amended by the addition of the following words :—“unless a preparatory examination shall have been taken in regard to the offence committed and the Attorney General or Solicitor General thereafter remits the case to the Court of the Magistrate for trial, in which case the Magistrate may inflict the punishment prescribed by law under the authority of the remittal, provided that the punishment prescribed for any offence by this Ordinance is not exceeded.”

Farms and Farming in Rhodesia.

VICTORIA DISTRICT.

The Victoria district extends from the Nyadzidza River in the north to the Lundi River in the south, and from the Sabi River in the east to the Shasha River in the west. It includes the native areas of Chilimanzi, Gutu, Ndanga, Victoria and Chibi. All these rivers eventually join the Sabi, and the principal watershed runs through Chilimanzi and Gutu, which districts are consequently higher than most other portions of the Victoria district, and are spoken of by the resident farmers as the high veld, in contradistinction to Ndanga and Chibi, which are considered low veld.

Victoria, to-day one of the most remote portions of Rhodesia, and regarded generally as quite out of the beaten track, was at one time a place of importance on the highway of civilisation. The civilisation of the white man rolled north through the district along the pioneer road from Tuli under the protection of the fort at Victoria, the towers of which still stand, though the walls have been demolished to make room for Government buildings. At a much more remote date the region must also have been the scene of a high culture which vanished long before the invasion of the white man. Whatever may be the mystery which surrounds the grey ruins of great Zimbabwe, this much is clear, that a numerous race once peopled the region—powerful, skilful, having something to protect and something which others, presumably a barbarous race, might want to wrest from them. Strong motives there must have been to bring into existence these dwellings, fortresses or temples, and an intellect and power far surpassing those of the present day native. Beyond the ruins themselves there is nothing left to indicate the character of the builders, the period of their

occupation, nor the manner of their life. The natives, their customs and habits, their cattle and other stock, their crops and their huts shew no material differentiation from natives elsewhere in Rhodesia, and their traditions and superstitions in no way connect them with the wonderful and inscrutable pile.

To-day Victoria is suffering from suspended animation, awaiting the revivifying influence of the railway now promised at no distant date, and in anticipation of which there has of late been an influx of new settlers and a renewed demand for land. Besides the land recently taken up on permit of occupation, there are a number of farms selected in the old days on pioneer and Victoria agreement titles, some still occupied by their original peggers, some occupied on behalf of their white owners by coolies or natives, others held unoccupied and unimproved by companies, and four farms owned and worked by Basutos and local natives. There are large, exceptionally large, native reserves, and a considerable extent of unalienated land still vacant.

Up to the present the main settlement of white farmers has been on the banks of the chief rivers, where the prevailing granite soil is combined with vleis and alluvial soils.

There is a great variety of farms; indeed, the district offers a very wide selection as regards the character of the land.

There are tracts of granite best suited for cattle-ranching on extensive lines, or for cultivation by the native, who prefers such land to the red and brown loams on the "formation." There is also granite soil favourably situated as regards water, with good vleis and possibilities of irrigation, where dairy-farming and pig-raising is indicated, coupled with tobacco or fruit culture, especially oranges.

The formation belt runs almost east and west for an estimated distance of 90 miles, through the town of Victoria, but is generally never more than 4 or 5 miles wide. The farms situated here generally combine both granite and red soils; maize, wheat, oats and manna can be grown in large areas, and the veld is capable of carrying a heavy stock of cattle. The country in general is level or gently undulating, but ranges of

hills, such as the Mashaba, Beza and Inyoni mountains, add variety and beauty to the landscape, besides affording useful changes of altitude, giving rise to springs and rivers, and carrying more valuable timber than is obtained on the plains.

West and northwards of Victoria the land is generally poor and of little value for agriculture. A few well-selected farms, however, contain tracts of great fertility, and a crop of maize grown on first-year land, without manure, at Thornhill is one of the finest the writer has seen this season (1913) in Rhodesia. To the south and east of the township, however, lies some very fertile country, well watered, with good veld, as fine farming country as is to be found in Rhodesia. Beyond this area lie great stretches of native reserve—Gutu, Ndanga and Chibi—as well as unalienated land, including some of the best of cattle country and fertile valleys.

As regards products, the accusation so frequently and unjustly levelled at South Africa as a whole that it is a land of samples, appears to be true as regards Victoria, but it might rather be called a land of proved possibilities not realised for lack of outlet to markets. The local markets comprise the small requirements of the township and the needs of the gold, tin and asbestos mines; these again being restricted on account of the present distance from the railway, limiting operations and retarding progress.

The chief output of the district takes the form of cattle, mainly derived from the enormous herds on the native reserves, thousands going out annually to supply other parts of Rhodesia with breeding stock and spans of trained oxen. Indeed, the chief present importance of Victoria is as a source of supply of breeding stock to the rest of Rhodesia. The cattle-holding of the Victoria farmers is relatively high. These cattle are fairly evenly distributed, most farms carrying a couple of hundred head—only four farmers can boast of over five hundred cattle. The Victoria district contains a far larger number of cattle than any other district in Rhodesia, notwithstanding the fact that other districts have largely replenished their own herds from here during recent years. Not only are the cattle more numerous, but, owing to infusions of blood from the Transvaal, a large number are of a distinctly improved type. The census of

1911 gives the number of cattle owned by Europeans in the magisterial division of Victoria as 10,514, of which one half were cows, and 110,599 owned by natives—a total of 121,113 in 1911, against 47,213 in 1904. These figures have, of course, altered relatively as a result of the drought in 1911-12, when large quantities of cattle were bartered by the natives in exchange for grain.

Only the simplest course of breeding has hitherto been practised, but possibly cattle-owners have adopted the wisest plan, having regard to conditions until quite recently obtaining. One finds that, as a rule, men having other occupations than farming, have invested money in land, and have for a number of years steadily collected cattle from any available source (principally the native herds), and have used any and every sort of available sire. These herds now vary in numbers from 150 or so to 2,000 or 3,000, and consist of native or local cows, which are generally divisible into four types which, for want of better names, one may call pure Mashona, Shangaan, polled and improved Victoria.

The Mashona cow is a small light-boned animal, black or red, or black and white, or red and white, or mouse coloured. The skin, hoofs and horns are generally black. The horns are large at the base, of medium length and grow upwards and outwards; curving in again slightly at the top. The back line is fairly straight; there is no "hump," and the rump is less sloping than in the Africander; the head is of a clean "milking" type, the milk is rich but deficient in quantity, and only sufficient for the calf's requirements.

The Shangaan cow is a large more-roomy animal than the Mashona, the result of crossing the larger cattle of Khama's country, which were captured by the Matabele, with local Matabeleland cattle, these cattle being subsequently taken from the Matabele by their Mashona slaves on the downfall of Lobengula. The colour is usually black, or black with white markings; the skin, horns and hoofs are black; the horns are rather long, of medium thickness, growing with a symmetrical free outward and upward curve, and have almost invariably a characteristic backward trend for the last three or four inches. The milking qualities are about the same as those of the Mashona.

The polled native type is at first sight much the same as the Mashona without horns, but on closer examination it is found that the bone is finer; the frame shews rather more quality; the muzzle is particularly fine and small, and there is a marked resemblance to the polled Aberdeen Angus, albeit there is no reason for supposing that there is any relationship. The colour is usually black, but other colours do, however, occur, and broken colours are rarely if ever found. The skin and hoofs are black. These animals have a strong tendency to produce polled progeny, but their blood has become so intermingled with that of horned varieties that they cannot be depended on to breed true. Similarly, some horned individuals breed hornless calves. An intermediate type of horn, known as "slug horn," sometimes occurs.

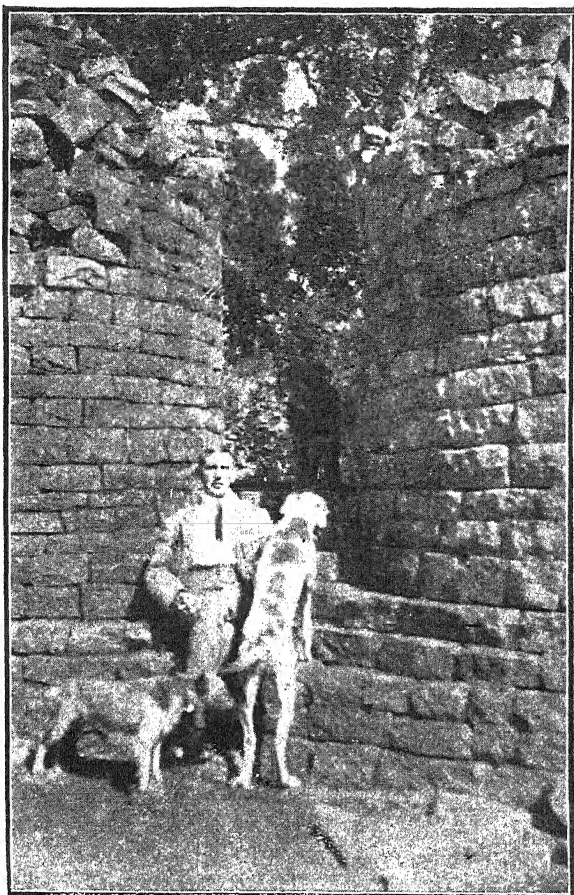
As before mentioned, a considerable number of cattle shew a distinct improvement on native breeds. This improvement has come from cattle introduced at various times and by various means from the Transvaal, and betrays traces of Shorthorn, Friesland, Ayrshire, Kerry and Africander blood. The most noticeable improvement thus effected appears due to a certain bull which was bought by Mr. Everard, at one time manager for the D.R. Mission at Morgenster. The progeny of these imported animals shew increased size, greater width of rib, straighter outline, a tendency to earlier maturity and better milking qualities. Those tracing descent from Mr. Everard's bull are largely of whole black colour, and shew a preponderance of Friesland blood. The Africander blood predominated largely amongst the bulls in common use in Victoria until recently, while here and there a pure native bull has been adhered to. During the last few years, however, quite a large number of bulls, the offspring of Mr. Everard's bull above mentioned, have been running with the various herds with marked result. The original bull was bought by him from one of the early Melsetter trekkers and sold to Mr. Posselt, who again sold him to Mr. J. H. Williams. He was a large well-shaped animal of Fries-Africander blood; black in colour, shewing more Friesland than Africander, and of great prepotency. Fortunately for the Victoria district his progeny, which resemble him in an extraordinary degree, and in which the Friesland blood has been wonderfully maintained, caught the eye of the Victoria cattle-owners, and have



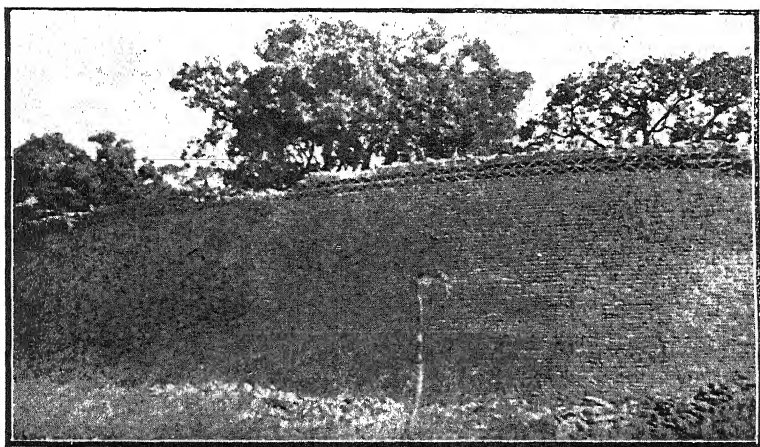
Thorn Tree at Mr. Holland's farm, Thornhill, Chilimanzi, probably the largest in Rhodesia.



An exceptionally fine stand of Maize grown on a sand vlei at



Zimbabwe Ruins.



been permitted to perpetuate the old bull's qualities in some thousands of the younger cattle seen running to-day. Within the last twelve months better bulls have been introduced and have given great satisfaction, although in some cases losses have been sustained. The breeds preferred have been Shorthorns and Frieslands, but North Devons, Sussex and Herefords are also included.

Here, as elsewhere in the world, the points to be considered in grading up the local cattle are, firstly, the class of cattle the land is suited to; and, secondly, the object for which the graded cattle are required—milk or beef. Where the object is milk, with a view to sending cream to the Gwelo creamery or elsewhere, Shorthorn of milk strain or Friesland sires are indicated—the Shorthorn on the warmer richer farms and the Friesland on the more open. The Friesland will obviously “nick” well with the progeny of the Everard bull.

For the production of beef, something to suit every farm in the district should be found amongst the Sussex, Devon, Hereford or Shorthorn (beef type). On the poor, or dry or exposed, farm the Sussex will certainly be the safest; on medium farms the Hereford; and on the richest veld there appears no reason why the Shorthorn should not thrive.

There is obviously a desire amongst all stock-owners in the district to improve their cattle. Many fear the pure-bred bull, both on account of original cost and liability not to thrive. Unless one is prepared to feed and house the pure-bred bull adequately, undoubtedly a half-bred bull of the breed to be used is what is required, but there are few farms on which all that is required for a pure-bred bull cannot be grown, and one cannot help thinking that most owners will be well advised to choose carefully what breed will suit their purpose, to procure pure-bred bulls of that breed, and to keep to that breed, with the object of grading up their herds to a standard saleable on the markets of the world and uniform in type.

Sheep owned by Europeans number only about 500, generally kept in flocks of from 20 to 50. The native type predominates, but considerable Persian blood has been introduced, and more lately Merino rams, but with a view rather of increasing the weight than of producing wool.





Native Cattle, Victoria District.



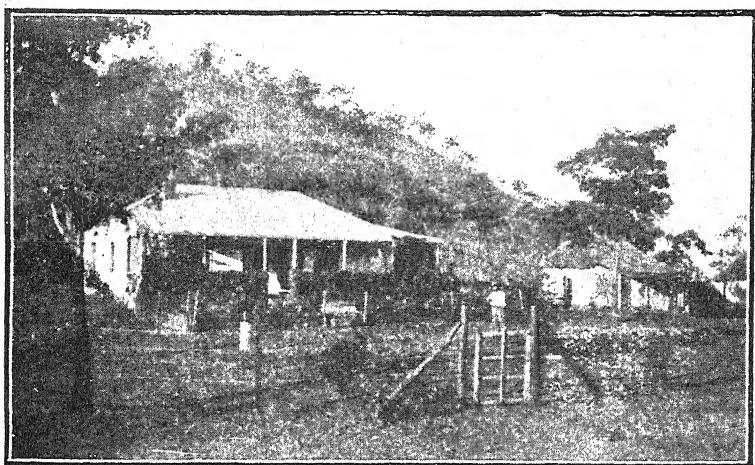
Native Cattle, Victoria District.

Goats are more numerous, although kept in only small flocks, but a feature of interest is the presence of a few pure Indian goats and a number of half-bred ones of this type. These were introduced a few years ago by the late Col. Flint, and at his recent dispersion sale they have been scattered over the district. They are undoubtedly a great improvement on the native goat, and are noted for their milking qualities, one ewe in particular giving, in addition to that required by her kid, a full gallon of milk a day. Goats of this kind are very useful to settlers who have few cows. Angoras have been tried by Mr. Hughes on the farm Beza, and have thriven well during several years.

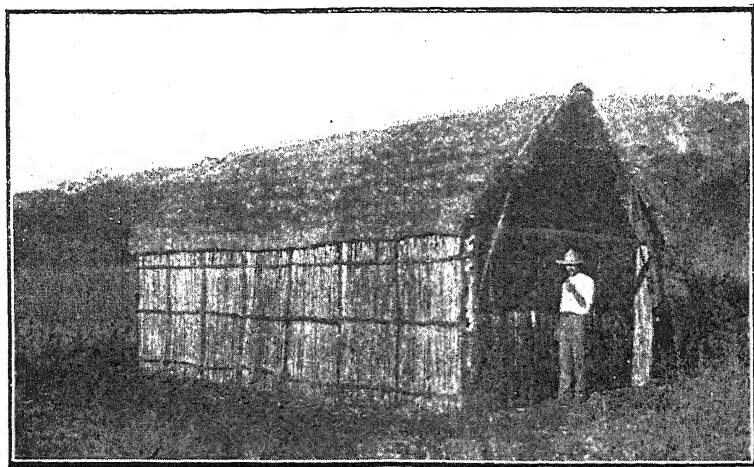
In a remote and self-supporting district like Victoria, the pig is in general evidence for domestic use and the local markets. Of late a few good Berkshires and Large Black pigs have reached the district, and should exert a beneficial influence. Most farmers have a few pigs, and several, notably Mr. Less, on Bompst, make a feature of raising and fattening them. From pigs introduced by him and other early settlers are descended all those now so generally kept by the natives, but unknown to them prior to the advent of the white man. Home curing of bacon is a common practice, and there is every prospect of Victoria farmers largely supplying the bacon factory with pigs, should the railway facilities and rates render this possible.

Less attention has been paid to agriculture in Victoria than in most other districts of equal promise. On the formation belt above referred to the possibilities in the way of crops are very large, and particularly in those localities where irrigation can be practised. The 1911-12 drought shewed the white farming community how profitable a grain crop might be under certain circumstances, and in addition the prospect of a railway to the district will add impetus to the production of purely agricultural produce. Maize continues to be the main crop, but considerable attention is now being paid to the production of winter crops under irrigation or on damp vleis, as at Mr. Barr's farm Thornhill, and Mr. Peck's at Makowries.

The chief irrigator in the district is Mr. Readman, who has several irrigation furrows laid out, irrigating an area of land about 80 acres in extent, with potentialities for irrigat-



Homestead, Marah Rancho, Victoria District.



A Cheap Shed, Marah Rancho, Victoria District.

ing about 200 more, all by gravitation. Mr. Richards, of Marah Ranche, has lately constructed a furrow to command a similar area. Few other farmers in this district have brought any appreciable extent under irrigation. The possibilities for irrigation in the Victoria district are not particularly good, chiefly owing to the fact that the larger streams and rivers run very flat, and are deep in their channels, and can only be brought on to the land by gravitation by long and expensive water channels. Owing to this disability, irrigation by pumping promises better than direct gravitation schemes, and now that there is a reasonable probability of Victoria district being linked up to other markets by rail, there is little doubt that if pumping schemes are carefully thought out they should prove of great value to the farmers and the district generally. The district is fairly well watered, and the streams pass through comparatively large areas of really good soil to the east and south-east of Victoria town.

In 1911-12 it was estimated that the total area under maize was not much over 1,000 acres, and the yield, owing to the drought, was small. In the present season the acreage under maize has been doubled, and the returns are likely to average from 8 to 10 bags per acre all round. Of wheat and oats under irrigation, the total area in 1911-12 did not exceed 100 acres, but this has been greatly increased this season, and further increase is certain in the near future. The chief variety of wheat grown is Early Gluyas, a variety distinctly superior to the Els wheat, which is also grown on a small scale. Victoria wheat as a summer crop is also being tried in some cases with great success. Oats are also grown on a small scale, and Boer manna has been uniformly successful in the district.

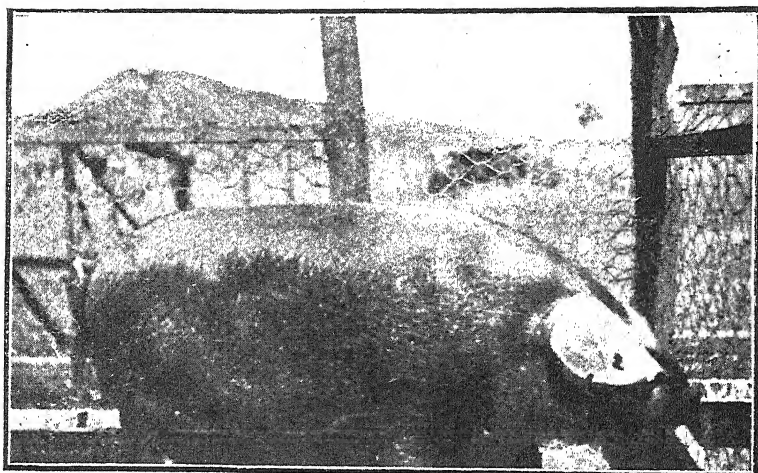
Tobacco is but little grown, and that produced is of the Boer type, air cured, and commanding only a local sale. There can be little doubt that there is a bright prospect in Victoria for tobacco of the sort now in such demand grown by those acquainted with up-to-date methods of culture and of flue-curing. There is abundance of soil adapted to Virginia tobacco, as, owing to the geological conformation of the country, the granite and the schist frequently occur side by side, giving rise to the much desired happy blend of sand and red soil beloved of tobacco growers. Labour is cheaper and much

more plentiful than elsewhere, and the women readily come out to do certain classes of work, so that handling leaf might easily be taught them.

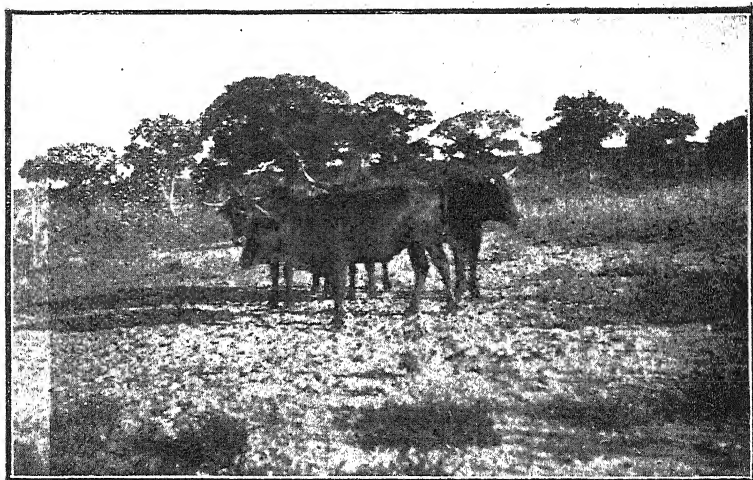
Citrus fruits do well, especially on the red soil on slopes where previously native bush was growing, and it is imperative to put them well above the frost zone. Irrigation of citrus fruits is not always necessary, but it is a great advantage if occasionally water can be brought to the trees. At present many farms have from 100 to 200 oranges, naartjes and lemons, and at Bannockburn Messrs. Erskine Bros. are completing an orange grove of 1,000 trees. Hitherto seedlings chiefly have been planted, but grafted trees, particularly the Washington and the Thomson improved Navel and the Valencia late varieties are now being obtained, no doubt with great advantage. Judging by sample of fruit and from trees up to twelve years of age, oranges should become a feature in this neighbourhood. Other classes of fruit, although largely planted, have not done so well, only bearing heavily in exceptional seasons, and being much infested with insect pests native to the district, as well as introduced. There are in all approximately 2,500 citrus and 5,000 other kinds of fruit trees.

The Khaki weed (*alternanthera eclipata*) has made its appearance in the district, and is to be found at nearly every outspan, and according to all accounts is spreading. Although not so troublesome in a district where sheep are few in number, it may yet become a formidable pest, should the wool industry ever be taken up; and farmers would do well now to eradicate the weed by gathering and burning the plants.

Victoria district is, of course, not without its drawbacks, but these are largely of a character that can be remedied. The chief disadvantage of distance will, it is hoped, soon be overcome by the construction of a railway line from Umvuma, 70 miles away, putting Victoria township within 110 miles of the main line at Gwelo.



Large Black Boar, Rhodesdale Estate.



Shorthorn Heifers, Rhodesdale Estate.

Dry Season and Droughts in Rhodesia.

(CONTINUED.)

By the REV. E. GOETZ, S.J., Director of the Bulawayo Observatory.

The dry season is also the winter season in Rhodesia. During this season the mean temperatures never go very low, as may be seen from the following figures for Bulawayo and Salisbury.

Mean Temperatures, April to September (both inclusive).

	Bulawayo. Salisbury.	
Mean maximum in shade ...	74.9	74.0
Mean minimum (in screen) ...	48.7	47.1
Mean min. of coldest month on record	40.7	39.6

Extreme temperatures are, however, of greater importance. On the uplands, freezing temperatures are extremely rare a few feet above the ground. The lowest figures recorded in a screen 4 feet above the ground were in Bulawayo—30.2 in June, 1905, and 28.9 in July, 1911. In Salisbury the lowest on record is 32.2. In the valleys freezing temperatures in the same conditions are more frequent. On calm clear nights cold air generally gravitates into the valleys and stagnates there. I have no instrumental data for valleys, collected in identical conditions as those given above, but in the hothouses of the North Park, in Bulawayo, in a valley that is only 30 feet lower than the upland at the Market Square, some plants were injured by frost every year before a heating apparatus had been installed. As far as can be judged, these low temperatures

occur only during an hour or two before sunrise. In the cold night of July, 1911, which gave the minimum of 28.9 mentioned above at the Bulawayo Observatory, the thermometer remained below 32 degrees for two hours only, just before sunrise. So far, no freezing temperatures have been reported from anywhere in Rhodesia after sunrise.

Besides these low temperatures, which are partly due to the general cooling of the atmosphere on winter nights, there are others which are principally due to nocturnal radiation. These give us the ground frosts that are frequent enough and are apt to occur in any of the winter months, even when the thermometer placed a few feet above ground marks several degrees above freezing point. The earth is constantly losing heat by radiation, only during the day it gains from the sun more than it loses, whilst the reverse is the case after sunset. The earth then cools rapidly, and this process goes on the whole night through. It is especially rapid when the nights are calm and clear. The layer of air in contact with the soil will in that case rapidly become nearly as cold as the ground. If, however, the sky is cloudy this nocturnal cooling will be compensated by heat radiated back by the clouds that are warmer than the cold clear regions above. On clear nights, if the air is disturbed by a breeze, the lower layers cooled by contact with the earth will be mixed with the warmer layers above, and frosts will either be light or not occur at all. On the uplands these frosts, due to radiation, may be expected any time from the end of May to September inclusive. The earliest on record at the Bulawayo Observatory was on the 25th May. But these May frosts have been light ones only; the lowest temperature has been 28.1. In September temperatures as low as 22.0 have been registered. In Salisbury, from July, 1904, to April, 1909, ground frosts have been recorded in two years in May, the lowest being 29.5, and one year in September (31.0). In June, July and August ground frosts on some nights in the month are the rule—it is rare that none occur. In Bulawayo, since 1904, there have been such frosts in each of these months, on every year but one, the lowest temperatures registered being 16.8 in July, 1911, and 18.6 in June, 1905. The same holds good for Salisbury, but the frosts have not been so severe, the lowest on record being 24.2 only; the observations, however, were for a period of five years only.

In the valleys these frosts are earlier, more frequent, and more severe. In the Bulawayo Park, at a place about 30 feet below the level of the upland, frost was recorded one year in April. The lowest has been 10 degrees Fahr. on the same night, when at the Observatory a mile away, and from 30 to 40 feet higher, the temperature went down to 16.8 only on the ground, and to 28.9 four feet above. On the same night at the Matopo Park the thermometer marked 6 degrees Fahr. Since these ground frosts are due to radiation of heat from the earth to the sky on clear, calm nights, it is evident that those who think it worth their while to protect their plants from this frost can do so to a certain extent by checking this radiation. In a general way, any means which will cut off a view of the sky will check the radiation to a great extent. In the Californian orchards and in the Bordeaux vineyards braziers are lit during one or two hours before sunrise, to create a thick cloud of smoke above the trees or vines, so as to cut off the view of the sky. This "smudging," as it is called, is often successful, although for some unknown cause it sometimes fails. To protect small areas, coverings of straw, thin planks, and even cardboard are used with success. Where irrigation is possible, it is generally useful to saturate the ground with water. The layer of air near the wet ground is nearly completely saturated with water vapour. When this air gets cooled in the process of the nocturnal radiation, a part of the water vapour condenses, and this liberates a great amount of latent heat, which prevents the lower layer of air from cooling to an injurious degree. Some more delicate plants, however, are apparently injured by this process, owing to the fact that their cells, when saturated with water, are more sensitive to frost than when in a drier condition. It is generally recommended to protect plants that are exposed to frost from the early rays of the rising sun. Plants which may be frozen without being injured if the thawing process is slow have their younger sprouts destroyed by rapid thawing, whilst older ones die subsequently. Latterly, however, this influence of the sudden thawing has been called into question.

Prevision of frosts is not generally an easy matter where there is no public weather forecasting service issuing daily weather bulletins. The surest indication from non-instrumental observations of a possible ground frost in the coming

night is when, the air being calm and clear in the early part of the night, or only agitated by an insignificant breeze, there is a noted difference of temperature between the tableland and the valleys. When this happens after April or the middle of May, the air is nearly always very dry. The dewpoint, that is the temperature at which dew is deposited, is then generally far below the air temperature. The minimum will not go below the dewpoint, but a low dewpoint in the evening is then usually the forerunner of a low dewpoint for the next morning, and on those occasions of a low air temperature.

The end of the dry season cannot be considered as part of the winter season, for it is the time of the year in which we are apt to experience the highest temperatures. In this respect we have to include October in the dry season, as the rains do not as a rule start before the end of the month, and, as often as not, not even in this month. The mean maxima for these two months are:—79.0 and 82.5 for Salisbury, and 81.3 and 85.6 for Bulawayo. The extreme temperatures recorded during the same period have been 91 and 99 in Salisbury, 97 and 102 in Bulawayo. These temperatures are not unbearably high, but they are accompanied by an exceedingly dry atmosphere and the highest winds of the year. These are obnoxious features from an agricultural point of view. During these two months the relative humidity is very low. In Salisbury the average at 9 a.m. is 48 per cent. in September and 49 in October; in Bulawayo at 8 a.m. it is 48 and 51. In both places these percentages are the lowest of the year, and we may say that during these two months the humidity remains for from 12 to 14 hours every day below these figures. The recording instruments at the Bulawayo Observatory shew that during these months the relative humidity goes below 10 per cent. for several hours on many days, a circumstance which accounts for the withering effect which the heat—after all not excessive—has on plants at the end of the dry season.

The wind movement is also the highest of the year during these two months. In Bulawayo the mean daily number of miles of wind for an average of eight years is 231 for September and 230 for October. In no other month has the mean exceeded 190 miles. In Salisbury the corresponding means are 174 and 180; the next highest month gives only 140. The con-

sequence of these high temperatures, high winds, and of this dry state of the atmosphere is that evaporation is particularly active during these two months, as all three factors help to promote it.

Last year the evaporation registered in Bulawayo during the months of September and October was 7.17 and 9.30 inches. The evaporation gauge had been erected in April only, but from its records during that time I consider that the year's evaporation would have come to about 70 inches. The evaporation during these two months represented, therefore, 23 per cent. of the year's evaporation. During the dry season of last year, counting it from April to November, since no rain worth mentioning fell during that period, the evaporation was 38 inches. In the report on the various schemes for the Salisbury water supply, Mr. Melvill, from four years' observations, gives the mean evaporation from the surface of the Witwatersrand reservoir as 28 inches during the same months. The yearly evaporation is likely to be slightly greater in Rhodesia, owing to the fact that October is here a drier month than in the Transvaal. These figures of Mr. Melvill refer to bodies of water of considerable depth. In the case of shallow pools this rate of evaporation will be considerably higher. I consider it of great importance to draw the attention of farmers to the bearing this feature of the dry season has on farming operations. The winter season in Rhodesia is not only a dead season, but unless proper precautions are taken, it is a highly destructive one with regard to the most important element of fertility, namely, soil moisture. We have no observations on the evaporation from the soil in South Africa, but from the consideration of the factors which promote evaporation, we may gather that it is considerable. Evaporation increases with diminished pressure. The pressure over the Rhodesian plateau remains between 25 and 26 inches the whole year round. Heat is the force which produces evaporation. Under its influence the surface layer of the evaporating body is constantly bombarding the adjacent layer of air with vapour particles. The greater the heat the more intense is this bombardment. For every ten degrees increase in the temperature of the water American investigators found an increase of one inch per week in the rate of evaporation. This incessant bombardment of water vapour soon saturates the adjacent layer of air, and the

water falls back on the evaporating surface. But if the adjacent layer is very dry, as is the case at the end of our winter season, it will take a considerably larger amount of water to saturate it. The breeze, which is nearly constant during these months, sweeps the layers of saturated, or nearly saturated, air off the evaporating surface, and brings new dry layers in contact with it, and thus the process of evaporation goes on constantly. If we apply this to the soil moisture, which by capillarity is brought to the surface of the ground, we see that everything is propitious for a rapid evaporation. The temperature of the surface layer of the ground is enormous. We have no observations of the surface temperature of the ground in Rhodesia. The only data available are those for April of this year, at the Bulawayo Observatory. During this month the mean maximum temperature indicated by a thermometer, the bulb of which was just covered by the ground, was 99 degrees Fahr. It indicated over 100 degrees or up to 114 on 19 days. This high temperature penetrates for a considerable distance into the ground, as may be gathered by the fact that the mean temperature one foot in the ground at 8 p.m. at Bulawayo from 1905 to 1911 was 80.4 and 86.6 for September and October. The force which produces evaporation is, therefore, considerable in the surface layers of the ground. The factors which activate it, *i.e.*, dryness of the air and wind-velocity, are at their maximum. The result is that by the end of the season the ground is dried up to a considerable depth. Farming operations are in consequence retarded when the rains come in many parts of the country. The first rains that fall on the parched ground are unable to penetrate far enough to reach the sub-soil moisture and start an upward movement of the lower moistures, with the result that plants raised too early are apt to be injured, or even to die off. There are not many farmers in Matabeleland who have not had to plant their mealies twice some years when they had planted before December. Natives, more than once during the last ten years, have had to plant their crops three times. This deperdition of the soil moisture can, to a great extent, be lessened by following the advice given by practically all agriculturists in dry lands. What is urgently recommended by experts, both in Western American and in Australia, is that the land that is intended for crops should be properly prepared in time. Professor

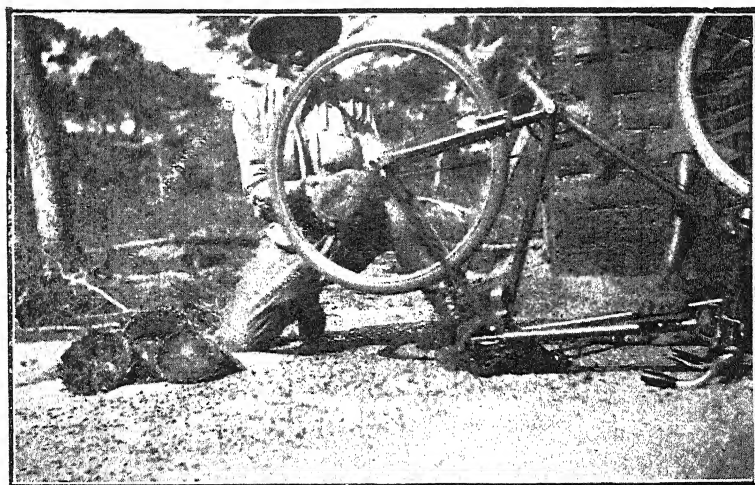
G. L. Sutton, Wheat Experimentalist of the New South Wales Department of Agriculture, writes (quoted in "Dry Farming," Aug., 1912):—"In dry districts a proper system of fallowing is essential. With a proper system in practice, the rainfall of the previous year or a portion of the previous year can be stored and utilised for a subsequent crop. Fallowing as practised by many farmers consists in ploughing the land in winter or early spring, and then allowing it to remain undisturbed until just before planting time, when it is reploughed or cultivated before it is seeded. This plan is good, in that it loosens and aerates the surface soil, facilitating the absorption of rain, and thus enlarging the natural capacity of the soil as a water reservoir; but it is deficient in that it does not provide for the prevention of waste and loss by evaporation of the water stored. Working the fallow ensures that the surface of the soil is kept loose and dry, so that it forms an earth covering or mulch. This acts as a protective covering for the moisture-laden soil beneath. For practical purposes, a mulch two and a half to three inches thick is deemed most economical. Thinner mulches are not effective enough, and thicker ones, though more effective, are not sufficiently more effective to warrant their extra cost. . . . As a result of such treatment, the seed bed will be clean, in good tilth, with the soil immediately below the surface in that compact condition which induces capillarity, and admits of the free upward flow of the soil water from the sub-soil, thus providing conditions favourable for ready germination and vigorous growth." In short, this means harrow efficiently immediately after ploughing.

These remarks from an expert in a country which has more or less the same climate as ours, shew that the practice so often followed by the Rhodesian farmer of turning up his land during the winter and letting it lie for weeks before harrowing it is highly wasteful of soil moisture. Professor S. W. Fletcher, of the Michigan Agricultural College, is more emphatic still. Speaking of the practice of late ploughing, he remarks, "that ploughing should be done early, before the days when a hot sun and a drying wind suck from the unploughed soil much of the water that the crop could use to great advantage. A soil may lose as much as twenty tons of water weekly by being left unploughed late into the spring. This is equal to 1.75 inches of rainfall." Speaking of the

proper time for harrowing, he says, "In harrowing, as well as in ploughing, there is a good deal in catching the soil at the right time. If the land be inclined to be wet and the up-turned furrows have a glazed appearance, it is well to let them dry before harrowing. Several hours, or even several days, may be needed to bring them to the state of dryness when the soil will crumble nicely. No other consideration should influence one to harrow before this. It is better to lose some of the water in this soil by evaporation than to run any risk of injuring its texture. On the other hand, if the soil turns over mellow, and ready to be harrowed at once, the time to catch it is right then, before it becomes dry on top. A delay of a single day in harrowing a ploughed field may mean that half an inch or more of the precious water in it has been lost. . . . Some of the lighter soils dry out very quickly in the furrow, even in an hour or two. If it can be done without too much inconvenience, it is best to harrow these soils within a few hours after they are ploughed—certainly the same day." I might quote scores of other authorities from the dry lands whose unanimous verdict would be, that the best cultivation once the plant is in the ground cannot make up for the deficiency in the tillage of preparation, which ought to have been done immediately after the ploughing.



Threshing Wheat at Mr. van Rooyen's farm, Sterkstroom.



A simple but effective way of Shelling Sunflowers.

The Water Ordinance, 1913.

By W. MARTIN WATT, Agricultural Engineer.

As an Ordinance dealing with the rights to water has just recently been passed by the Legislature of this country, after having undergone a very detailed and, at times, a somewhat stormy discussion, and as the Ordinance has been specially designed to assist the farmers of this Territory who are, or intend to become irrigators, a few notes in explanation of this Ordinance may not be out of place, despite the fact that it still requires the approval of the High Commissioner before it can be placed on our Statute books.

The underlying principle of the Ordinance is that of State control, which is clearly enunciated in clause 5 of Chapter I., which reads :—"All water, other than private water, is vested in the Administrator, who shall authorise its use, diversion and apportionment, subject to the terms of this Ordinance and in conformity with any regulations framed thereunder." It has been stated that this is a new principle, and that as a young country we should not experiment, but it might here be pointed out that it is very far from being a new principle, and that it exists to-day in every irrigating country in the world where the population have been educated to appreciate its value, and where servitudes, prescriptive and other rights have not been of such importance as to ensure sufficient influential support to prevent its adoption. The writer can assure the farmers of this country that the authorities of the Union of South Africa would have welcomed the principle had it not been that it was considered impossible to carry it through their Legislature owing to the obstacles mentioned above. The following countries, among others, have been able to adopt the principle : Italy, several of the United States of America, South

Australia, and—in a very stringent way—India and Egypt. Without its adoption it would have been practically impossible to have carried out the large and valuable irrigation works that exist in these countries to-day. It has further been stated that riparian rights under common law have been taken away. This is not disputed, as under the present Ordinance common law rights will cease to exist. But common law rights are purely theoretical, and from a legal point of view are just about as difficult to apportion and define as would be the case if we had to decide the exact quantity and portion of air which each individual is entitled to inhale. By State control it is hoped to apportion the use of the public waters of this country so as to be of the greatest benefit to both the individual and the community at large. *Par exemplo*, assume that there are two neighbours on opposite banks of a public stream, both, in consequence, being riparian owners, one of whom could irrigate a large area of ground, while the other, owing to topographical and other reasons, is unable to utilise the water at all. It would obviously be unfair to split this water in half, as might occur under common law, but could hardly occur if State control be exercised as provided for in the Ordinance under discussion. Before leaving this rather vital principle, it might be as well to explain how it is intended to be put into operation. Any farmer or body of farmers desiring to use public water must apply to the Administrator to have his right to such defined. Should the Administrator consider it necessary, or should he be petitioned to do so, before granting this right he shall instruct a Water Court, as constituted under the Ordinance, to consider the matter, if advisable, on the spot, when the claims of any objecting owners shall be duly considered, and the right of use to the water only apportioned after a report has been received from the Water Court. By this means it is hoped that the fairest possible division may be arrived at and possible future litigation reduced to a minimum.

Another important provision is that in Chapter IV., which deals with servitudes. The rights granted under this Chapter are subject to compensation, but are very important and of great value to the intending irrigator. They consist of "servitude of storage," "servitude of abutment" and "servitude of passage." "Servitude of storage" gives the right to occupy land belonging to another by submerging it with water, and

gives the proprietor of the land thus submerged the right to benefit by sharing in the cost of the work, but only if he joins in the scheme before the work is commenced and thus takes equal risk with the originator of the project. In case of dispute as to the proportion in which he may claim a share, the matter would be referred to a Water Court.

“Servitude of abutment” enables a farmer to occupy, by means of a dam or weir, the bed or banks of a public stream belonging to an adjacent owner. It also gives the right to the owner whose land is thus occupied of sharing in the work, on paying a proportionate share of the cost. If the work be a weir for purely diversion purposes he can join in the scheme at any time upon paying his share of the cost; but should the work be for storage purposes, only on the condition that he joins in at the commencement of the work.

“Servitude of passage” gives the right to carry a furrow across the land of another.

In order that these servitudes may be exercised, clause 44 of Chapter IV. of the Ordinance gives any person who has a right to the use of water of a public stream at any point in its course the right to divert it at any other point in its course most suitable to him, to enable him to exercise his right to the use of such water.

Private water, of course, belongs to the proprietor of the land on which it is found, and of which he has the sole and exclusive use.

A public stream is defined in substance as a natural stream of water which, in ordinary seasons, flows in a known and defined channel, and which is capable of being applied to the common use of riparian proprietors.

It has, for reasons to be explained later, been considered necessary to keep storm water separate from the other waters of a public stream, and storm water has been defined, in substance, as any water flowing in a public stream in excess of the average flow of such stream. The average flow is considered as all the flow not caused by floods due to rainfall.

The chief reason for keeping storm water apart from what is frequently termed the normal flow is to afford greater security to any riparian proprietor who has the enterprise to check floods from running to the sea. Any projects dealing

with storm water will generally be large storage reservoirs, in many instances costing large sums of money. No one is likely to attempt the construction of any expensive work if, by future litigation, he may be deprived of his right. Clause 16 of the Ordinance is the only section dealing with storm water, and gives power to the Administrator, under advice from a Water Court, to grant an application for the use of storm water, the grant to be secured by publication in the official *Gazette*. In practice it is impossible to divide storm water among riparian owners, and even if it were practically possible, it would not be fair either to the individual or to the community as a whole, for the very important reason that every riparian proprietor is not necessarily in a position to make use of flood water. Large storage sites on any river system are usually few and far between, and the intention of the clause is to so safeguard any individual or body of farmers as to encourage him or them to carry out such works.

In apportioning public water, other than storm water, several guiding rules are laid down, and the use of public water is divided under three heads, viz., primary use; secondary use; and tertiary use. Clause 6 of Chapter I. states:—"Any person shall have the right to use for domestic and drinking purposes, and for watering stock, public waters which are found in their natural channels or beds at such places as access to the same may be lawfully had"; and, *inter alia*, clause 7 reads:—"Every riparian proprietor shall have the right of impounding, diverting, and taking any public water for primary use and the watering of stock necessary for ordinary farm requirements." Clauses 6 and 7 may be taken to define primary use. Secondary use is for irrigation purposes and for the watering of stock other than that necessary for ordinary farm requirements, while tertiary use is for mechanical and industrial purposes. Clause 8 of the same Chapter states:—"An upper proprietor shall not be granted the secondary use of public water if by so doing he deprives any lower proprietor of the primary use thereof." Clause 9 is as follows:—"In apportioning water for secondary use, regard shall be had to the extent of all land irrigable by such water, and the proposed method or possible methods of user of such water"; while clause 10 states:—"In apportioning water for tertiary use, regard shall be had to the actual and potential rights of primary

or secondary users." The foregoing are the main guiding principles to the Administrator and the Water Courts when called upon to apportion water of a public stream. Should riparian owners be unable to use the whole of the waters of a public stream, it may be allowed to be taken on to non-riparian land, or after non-riparian land in that water-way has been satisfied, into another catchment area.

Chapter II. of the Ordinance deals with combined irrigation schemes and with irrigation loans. Machinery is provided for the election of members of Irrigation Boards. These Boards are to be accorded certain powers, which shall be provided by regulations, and will act somewhat as a working committee to supervise the carrying out, maintenance, etc., of the combined work. Only the proprietors benefiting by the scheme shall have the right of voting for members to the Board, and each proprietor's voting power shall be proportionate to the extent of the irrigable land held by him. Provision is made for granting irrigation loans at 5 per cent. per annum, repayable by equal instalments spread over a period of years, not exceeding twenty, sufficient to redeem the loan and cover interest charges.

Chapter III. deals with the constitution and powers of Water Courts. These Water Courts shall consist of an advocate of not less than ten years' standing, or of a Magistrate, who shall be president, and of two assessors, one of whom shall be a qualified engineer, and the other a person selected from a list of persons nominated by the Administrator and styled the unofficial member. The unofficial members of Water Courts shall be responsible persons whose names appear on the roll of voters for members of the Legislative Council.

In cases of dispute arising out of apportionment of water, etc., under the provisions of the Ordinance, it is necessary for the disputants to first bring their case to the Water Court, although with right of appeal to a higher tribunal. The intention of this is to cheapen the cost of litigation and to prevent a wealthy owner or company from at once dragging a poorer neighbour to the Higher Courts. It is also hoped that as time goes on these Water Courts may become so well trained in water litigation that appeals from their decisions will rarely be upheld. This has been the experience in the Cape. In their

judiciary function Water Courts have similar powers and are governed by the same rules as Magistrates' Courts. In addition to their judiciary function, Water Courts may, if required to do so by the Administrator, investigate, define, record, and apportion the rights to water; determine and fix the site of diversion or storage; report on the use or waste of water, and the removal of or interference with any irrigation work.

Clause 61, Chapter V., of the Ordinance will prove of particular interest to those who have already carried out irrigation works, and as the clause as printed is perfectly clear, it is here given *verbatim* :—

“(1) Nothing in this Ordinance shall interfere with or derogate from rights already acquired, in so far as actual use has been made of such rights. All such rights, and such other rights to the use of water as may be acquired under this Ordinance, shall lapse and be void if not used for a consecutive period of three years, if such failure to use is owing to the neglect or default of the person possessing such rights. (2) Should the holder of any such right desire to have such right determined and recorded, he shall submit the matter to a Water Court for its decision.”

Chapter VI. deals generally with the powers of the Administrator in regard to public streams. It gives him power to appoint officers, to establish and maintain hydrographic stations, to construct, control, extend, alter, maintain and repair irrigation works, to sink boreholes and wells, to obtain and record information as to the extent of land under irrigation, the duty of water, etc., to advise farmers as to the construction, etc., of irrigation works, to construct or acquire any irrigation work, to exercise general supervision over all public streams, and to supervise and regulate the diversion, storage, distribution and use of water.

Chapter VII. deals with penalties. The highest penalty is inflicted only where a person maliciously or wilfully commits such a crime as, say, breaking down a dam or weir, which may have cost thousands of pounds sterling, and the maximum penalty for such an offence is liability to a fine of £500, or to imprisonment with or without hard labour for a period of two years, without the option of a fine.

Darkling Beetle Grubs Injurious to Tobacco.

By RUPERT W. JACK, F.E.S., Government Entomologist.

For the past two seasons the Division of Entomology has been paying attention to the losses inflicted to tobacco growers on the lighter soils by certain beetle grubs, which are generally referred to by the growers as "wireworms." For this misnomer there is abundant excuse, as the grubs are elongate, hard and shiny, and bear no small resemblance to the injurious wireworms of Europe and America. The name "wireworm" is, however, pre-occupied by the larvæ of "skipjacks" or "click beetles" (family *Elateridæ*), whilst the grubs injurious to tobacco belong to the family *Tenebrionidæ*, in representatives of which our fauna is particularly rich. These larvæ are slow in growth and not easy to rear in confinement. One species has, however, yielded adults at the Agricultural Laboratories, and the opportunity is taken of recording this fact, and of drawing attention to these by no means insignificant pests which are of interest to both the scientist and the farmer. It should be noted that this form of injury has not, as far as the writer is aware, been previously associated with the larvæ of this family, which, with the exception of such species as infest stored meal and grain, are usually considered practically harmless, although Mr. C. W. Mally, in the Cape Colony, has recorded injury to cereals from the grubs of the "Tok-tokje" (*Psammodes reichei*. S.), the most familiar representative of the family.

In this Territory, injury from these grubs has on occasion been of an overwhelming nature, the grower being quite unable to obtain a stand of plants on the infested ground. In other cases serious loss has been inflicted, but as a rule the grubs are present in inconsiderable numbers, and the few plants destroyed constitute a very small percentage of the crop. The capability of these insects for practically ruining a crop, however, when conditions are favourable to their increase,

renders detailed study of their habits and life history on behalf of the tobacco planters a pressing matter, and it is well that the growers should know that it is receiving the attention that it deserves.

Some of our readers will recall that Mr. C. S. Jobling, in a paper on tobacco, read before the Farmers' Congress at Gwelo last year, stated that the worst pest with which he had to contend was "wireworms," and Mr. Jobling had previously informed the writer personally that he had had to abandon the attempt to grow tobacco on certain land altogether, as the plants were destroyed as fast as they were planted. This was the first occasion on which these pests were brought to the notice of the Department. During the past season the writer has been busy collecting specimens of the insects and information concerning their destructiveness in the tobacco-growing districts, and has found that more than one species is involved. Some of the grubs attain a length of two and three-quarter inches, and are evidently the larvæ of a large beetle. Adults of this species, however, have not yet been obtained.

More progress has, however, been made with a much smaller species, of which specimens were collected on a farm in the Umtali district in February of this year. On this farm a 15 acre piece of newly broken land was planted to tobacco. The soil was of a light reddish sandy nature. The piece of land was on a ridge, the ground sloping away on either side. Half had been scrubby bush and half open. The original grass was sweet and not very luxuriant. The first planting had been quickly demolished to a remnant of about ten per cent. The greater part of the second planting was destroyed, and at the time of the visit the third planting was being killed out at an alarming rate. The cause of the mischief was a whitish yellow grub, measuring rather under an inch in length when full grown. The shape is roughly cylindrical, the integument hard and shiny. The shape, etc., may be seen by reference to the enlarged figures on Plate I. The strongly developed first pair of legs should be noted, as this peculiarity is not shared by the true wireworms. These grubs eat into the stem beneath the surface of the soil, sometimes completely severing it, but often eating it partly through and then eating upwards. The point of attack is usually from an inch to two inches below the soil level. The supply of sap is cut off, and

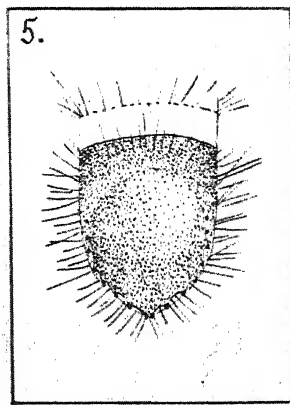
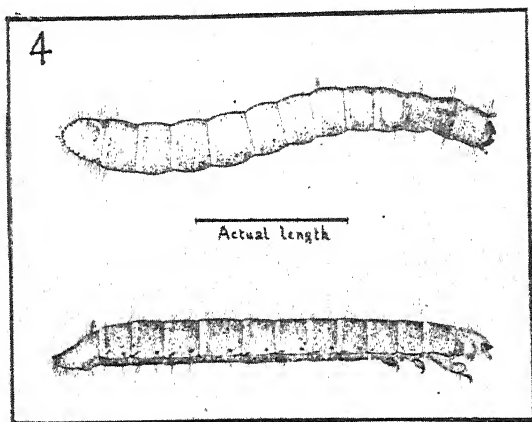
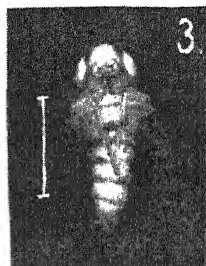
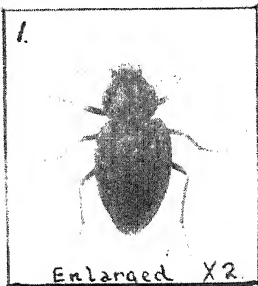


Plate I.

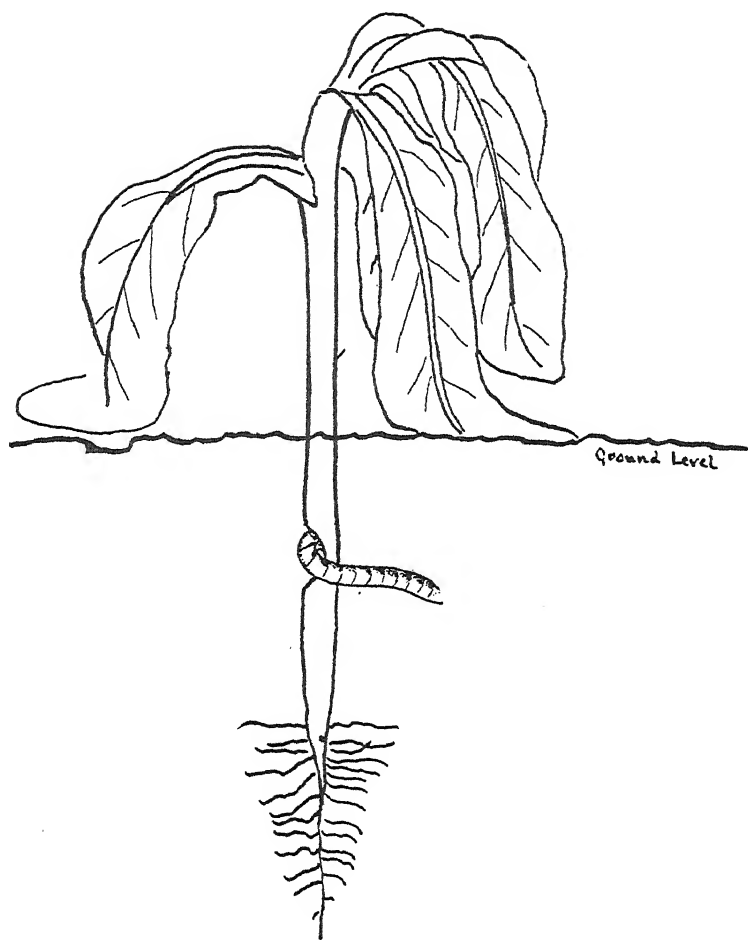


Plate II.

the plant wilts suddenly and dies. By digging up the freshly wilted plants the grubs can be found. The writer has never found more than one grub to each plant, but other observers have reported having found several on occasions. This is probably unusual, as the grubs are cannibalistic, and fiercely attack each other when they meet. The earlier attempts to breed adults failed on account of this trait, as it was found that if several were confined in even a comparatively large cage they devoured each other until only a single survivor remained. By enclosing them in separate receptacles, however, they feed and develop successfully.

The grubs collected in February made rough earthen chambers towards the end of March. When these cells, which are of a flimsy nature, were broken up the grub was found in each case curled up within with the posterior end lying over the anterior. The last grub was observed on the 26th March. On the 6th April one of the grubs that had been disturbed pupated on the surface of the soil. A photographic reproduction of the pupa (somewhat enlarged) is shewn on Plate I., fig. 3. Adult beetles began to emerge from the 24th April. The beetle is shewn enlarged on Plate I., fig. 1, and at its natural size at fig. 2. It belongs to the genus *Trachynotus*, and Dr. Peringuey, of the S.A. Museum, kindly determined the species as *T. griseus*. The bred specimens differ somewhat from the typical forms of this species, being of smaller size and lacking the median ridge on the wing covers. They are black, but are covered with a mixed orange and grey pubescence, which produces a dusty effect. They are entirely terrestrial in habit, the wing covers being soldered together so as to render them altogether incapable of flight. They may be seen commonly enough running over the surface of the soil. Their diet is very varied. To a limited extent they will eat living vegetation and also dead and dry leaves. They are much more strongly attracted, however, by dead insects, even of their own species. They seem to be quite indifferent to healthy living insects, even when powerless. A cutworm pupa placed on the surface of the soil was left unmolested for several days, but when injured was at once attacked and devoured. The beetles in fact exercise the function of scavengers. Although these grubs have only been found destructive on sandy soils, the beetles of *T. griseus* are common enough on the red soil about

Salisbury, and the grubs might be expected to be injurious. It is, nevertheless, an interesting fact that, whilst on the granite and sandstone farms every tobacco planter knows one or other species of these injurious grubs, on the red dioritic soils this form of injury appears to be quite unknown.

CONTROL MEASURES.—It is obvious that our knowledge of these insects is at present of a most limited nature, but from field observations and rearing experiments at the laboratories there is no doubt that the large species takes at least two years to mature, whatever may be the case of the species figured here. Also, the grubs are normally inhabitants of the grass veld, and only attack tobacco to such a serious extent because of the removal by ploughing and cultivation of their natural food, just as injury by true wireworms in Europe and America follows the breaking up of pasture. Obviously, then, these insects constitute an argument in favour of the growth of crops in rotation with tobacco, as the beetles are always liable to lay their eggs in fallow land that has reverted more or less to the condition of the natural veld. On the better soils this is generally done, and may be the reason injury has not been noted on the red soil. Experiments with a view to finding the most suitable crops to be grown in rotation with tobacco on the sandy soils are being carried out not only by the Department but by individual farmers, and once rotation becomes a practice, injury by these grubs will probably be confined to newly broken land. The present practice of using land for tobacco for two years, and then allowing it to be overgrown with grass for several years before using it again, renders the crop always liable to this form of injury.

EXPLANATION OF PLATES.

Plate I., Fig. 1.—Adult beetle enlarged to 2 diam.

„ 2.—Adult beetle natural size.

„ 3.—Pupa—enlarged. Actual length indicated by white line.

„ 4.—Larvæ (grubs) enlarged. Actual length indicated by adjacent line.

„ 5.—Anal segment of grub from above—much enlarged.

Plate II.—Diagram of grub attacking young tobacco plant.

The Tobacco Crop.

The 1912-13 tobacco crop is now arriving at the Warehouse, and, at the time of writing, 20th May, well on towards a million pounds of leaf have been received. The bulk of the tobacco is of good bright colour, and the quality thus far is well above the average.

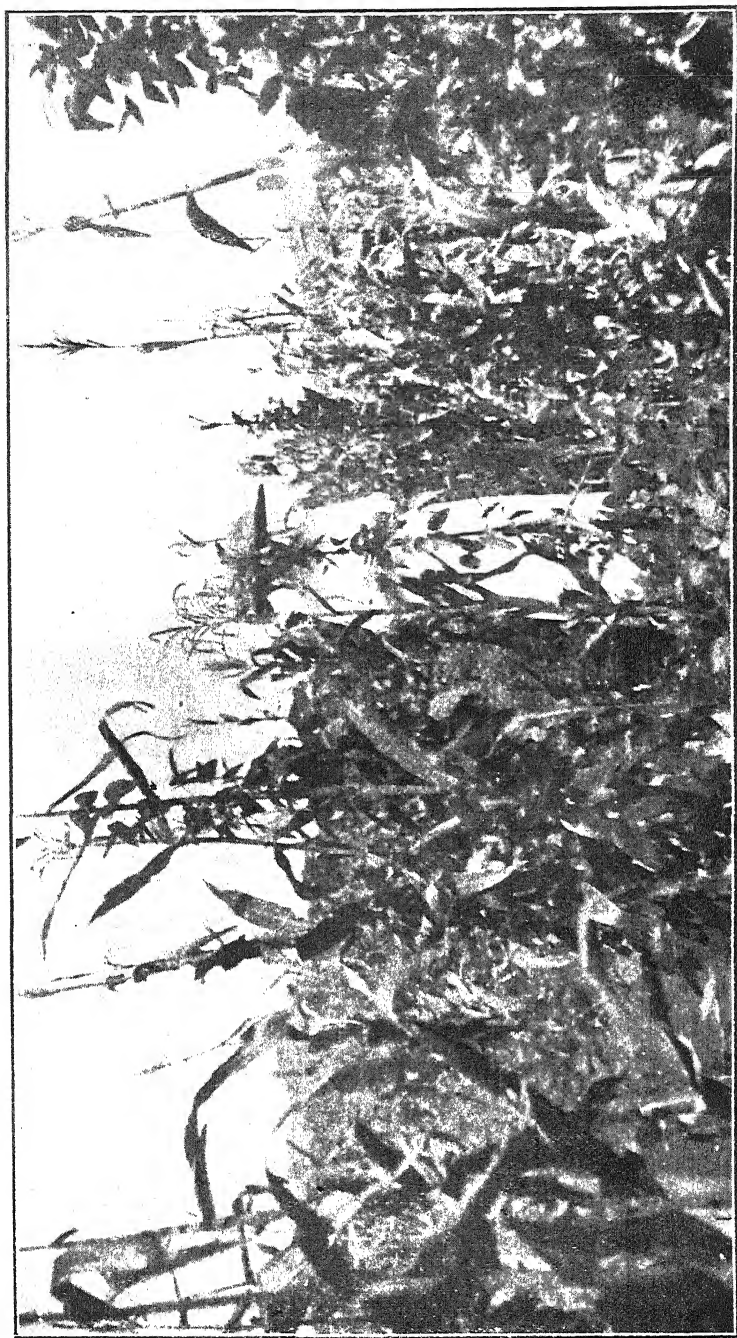
It would appear that the predictions as to the quantity of this year's crop are to be verified, and the extra warehouse accommodation, now well on towards completion, is likely to be taxed to its full capacity. "What is the price the tobacco is likely to realise at the auction sale?" is a question growers are anxiously asking, but it is one as yet impossible to answer. The uncertainty will, no doubt, lead growers to consider very carefully the extent of the areas they contemplate placing under tobacco next season. And the question demands very full consideration. We have before advised growers to look more to quality than to quantity, and we would again strongly urge them to only plant areas that can receive efficient European supervision.

The Treasurer, in his Budget Speech in the Legislative Council, contended that we are not receiving an adequate price for our tobacco, and that we are not getting the benefit of the protective tariff. Everyone will agree with Mr. Newton, but there is a good deal to be said on the side of the buyers too, and we can only trust that the growing public fondness for Rhodesian tobacco will lead to keener competition between manufacturers and to more satisfactory results as far as we are concerned. A market has been created in South Africa for our tobacco and the supply must be maintained. The trend of events may perhaps to some extent be gauged by the reduction that took place in the imports of bright leaf into South Africa in 1912. In 1911, 564,387 lbs. of unmanufactured leaf were imported from the United States of America. In 1912 the quantity dropped to 363,025 lbs. From Turkey, 37,761 lbs less tobacco were obtained in 1912 than in the previous year. It is

true that 51,489 lbs. more cigarettes were obtained from the United Kingdom in 1912 than in 1911, but this may be attributed to a natural increased consumption. We have thus half a million pounds of imported leaf to displace, in addition to close on 300,000 lbs. of cigarettes, which the Union and ourselves obtain annually from overseas. It is rather interesting to note that the average price of the unmanufactured leaf obtained from America is 10½d. per lb., and not 6d., as Mr. Risien informed us at the meeting of tobacco planters. Although, as he pointed out, the American product is stemmed and matured and ready for immediate use, it is difficult to realise that its value is 3s. per lb. more than the Rhodesian leaf.

Tobacco Boilers.

We have received a letter from Mr. E. J. Nason, of Sinoia's Drift Farm, Lomagundi, in which he mentions that during a stay in Johannesburg, after spending much time in the selection, he purchased a boiler for the supply of steam to his tobacco barns. He states that when at his farm he found it most difficult to get into touch with anyone who would be likely to supply a good boiler at a low price, and as he considers the boiler he has procured eminently suited to the work in every respect, he will be pleased to assist farmers who are in the same position as he was, to the extent of placing them in communication with the suppliers' representatives. Mr. Nason has sent us an illustration of the boiler, a noticeable feature being the large capacity of the fire-box. With wood fuel, Mr. Nason states, steam was raised within 1½ hours. The suppliers quote £34 for the boiler f.o.r. Beira.



Maize and Velvet Beans grown together as a mixed crop at Rhodesdale Estate.

The Herbage Preservation Ordinance, 1913.

By ERIC A. NOBBS, Ph.D., B.Sc., Director of Agriculture.

It has been generally recognised for some time past that a change was necessary with regard to the laws relating to grass fires. Everyone conversant with the rural conditions of Rhodesia knows that veld-burning is one of the greatest difficulties with which farmers have to contend, and one which, it must at once be admitted, cannot be overcome by legislation alone. What help the law can give to prevent the unauthorised, unexpected and malicious burning of another man's property should be provided, and this has been the aim and object of the Ordinance passed during the recent session of the Legislative Council. But the fact remains that from its very nature the evil is one largely to be overcome by individual care, by joint local effort and by educating all concerned to the nature, gravity and extent of the losses caused by such fires, as well as by impressing them with the terrors of the law.

The classes most concerned, besides the farmers, are the native population, transport riders and travellers, prospectors, sportsmen, engine drivers on the railways, also the police and those administering justice, and it is very necessary to emphasise in the minds of these classes, and indeed all sections of the public, the importance of the subject—the gravity of the crime of veld-burning and its far-reaching consequences.

The nature of the injury to the veld by fires, familiar to many as it is, may briefly be reviewed. The most obvious and direct loss is the destruction of winter feed. This usually happens at the very time when food is most scarce, often several months before there is any prospect of re-growth, and these fires rage most fiercely in the very veld which has been preserved during the summer to serve as the grazing ground in winter. There are many cases of justifiable veld-burning. The grass is often burnt intentionally, under adequate safeguards, for certain purposes, such as to secure early grass, to destroy rank growth, or to protect other veld from destruction. Further, even where we may consider it a bad practice, we must concede

to the owner of the land the right to do with his own property as he likes, even if it may be unwise, so long as it does not injuriously affect others. Besides the destruction of grass over areas frequently extending to hundreds of square miles, numerous cases occur each year of losses of crops, buildings, wagons, stores and small stock, amounting in all to a very considerable total. The annihilation of the seed intended by Nature to perpetuate and replenish the native grass and other herbage is a very material and direct loss, as also is the destruction of the humus, the organic matter on which the fertility of the soil so largely depends.

The baneful consequences of veld-burning also deserve notice. The impoverishment of stock, and the preventable mortality of cattle, sheep and goats must aggregate many thousands of pounds sterling every year. It is a well-known truism of stock-farming that it requires far more nourishment to restore lost flesh to an animal of any kind than to maintain it in that state, or to add flesh to a beast already in good store condition. Our stock generally lose flesh each winter, and to replace it the next year there must be an adequate supply of food. Then the reduction in value of emaciated stock, the diminution of milk supply at the period of good prices, and the injury to the next generation of calves, as well as the calving troubles experienced with emaciated cows, are all factors resultant upon starvation in winter. The conditions are naturally bad enough without being aggravated by total destruction of the dry grass, which in itself, with an adequate water supply, will sustain life. A further source of trouble is that as the grass is burnt away it often places any available pasture a long way from the water supplies, whereas every good stock-owner would wish to have his grass and water as near together as possible, especially during the cold dry season. The natural difficulties of keeping stock in the winter when, as is often the case, the country is swept by fire, and whole farms divested of all grass within a few weeks, or sometimes even in the course of a few hours, are thus terribly enhanced. This is the more lamentable as it is so altogether unnecessary and largely avoidable. Another evil, in addition to impoverishment and frequently starvation of stock, is the fact that the first growth following a fire is often more largely composed than is otherwise the case of poisonous herbage, springing from bulbs and roots unharmed by the fire, and appearing green and appetising when every-

thing else is black. Apart from direct poisoning which commonly occurs, there is the further fact that stock prefer the young green shoots on burnt veld, and will travel far to browse on them, discarding the old veld, consequently losing flesh on this immature and debilitating pasturage. The coarse tussock grasses, the hardy perennials with subterranean stores of nourishment, and the bushes and weeds are, on burnt ground, encouraged at the expense of the finer, more delicate and at the same time more valuable pasture grasses. The ground denuded of its protective mulch of grass is exposed to the drying influences of wind and sun, and the surface becomes hard and baked. This is an unfavourable seed bed, but more serious still is the fact that when the rains come they tend, instead of sinking in and being retained, to run rapidly off the bared surfaces into the water courses, being themselves lost, and carrying away with them at the same time the finer particles of the surface soil, creating sluits and dongas which drain out the land, and commencing that process of denudation and deterioration the results of which are all too apparent throughout other parts of South Africa.

There have of recent years been ample evidences that veld fires are on the increase, no doubt mainly owing to our increasing white and native population, but partly to the impunity with which the mischief can be done, and the obvious difficulty under present conditions of securing convictions.

Representations, amounting to bitter complaints and piteous appeals, have frequently been made by the Agricultural Union, Farmers' Associations and many private individuals on this subject, and in framing this new legislation the Government consulted with a Committee specially delegated for the purpose at the last Farmers' Congress. Many instances could be given of losses amounting to considerable sums, and of great hardships incurred year after year. Incendiarism may in some cases be the origin, but as a rule it is merely reprehensible carelessness or inconsiderateness. This may be prevented by impressing upon the offenders the gravity of the offence in the only way that really appeals to them, by the imposition of exemplary penalties.

The Government has in the past done what was possible under the law and with existing machinery. Annually the matter has been brought up, and all concerned with the prevention of the evil, especially Magistrates, Native

An Imperial Covent Garden.

By CHAS. E. FARMER.

It may interest readers of the *Journal* who are already engaged in or contemplating the growing of citrus fruits in Rhodesia, to know that the London County Council has agreed to grant to Lord Grey, on payment of £3,000 a year, an option for three years of taking up a 99 years' lease of the central portion of the Crescent site, between Aldwych and The Strand, facing the Church of St. Mary-le-Grand on the south, and Kingsway on the north. The ultimate rental of the site to be £50,000 a year. The main purpose to which this site is to be put may be explained by a reference to Lord Grey's evidence given in November before the Dominions Royal Commission. He stated:—

“I would like to throw out the suggestion that it would be a very great help both to the consumer and the oversea producer if we could have a sort of Imperial Covent Garden. I should begin with fruit, and with fruit only. If you had a building, imposing from its size and magnificence, it would be attractive to the people to visit it, and if you had a few stalls under the control of the oversea Governments, shewing what their countries can produce, we should all go and walk through and give our orders and have the satisfaction of feeling that we are supporting our oversea Dominions. . . . Nobody knows where to go now. From want of proper organisation we are not bringing home the facts to the British consumer; we are not making him sufficiently acquainted with the produce which we can obtain from our orchards in the oversea Dominions. If anyone goes to any of our big fruit-selling places, he will be very much impressed, if he makes enquiries, at the difference between the price charged for apples, for instance, from Tasmania and Canada, and the price which the producer gets.”

A recent issue of the *Spectator*, in an article on the above, says:—

“Probably not one Londoner in a thousand has any real conception of the possibilities of the markets of the Dominions in fruit alone. We pass by the windows of the various offices and agencies belonging to Canada, Australia, New Zealand, and Rhodesia, and stare vaguely at the displays of fruit, large and bright-coloured, in glass jars; at the photographs of magnificent scenery, the stuffed birds, the ears of corn, the tables of statistics, and the other attractions of life in the wider spaces oversea. But the quantities of fruit grown, the quality of the fruit, the ease with which such fruit is grown, the markets which could be supplied, these escape us. To take but a single instance, the fruit which without any exactness of naming may be enquired for as Cape plums. If you ask for Cape plums at a fruiterer’s shop to-day, you will probably find that the cheapest are about 3s. 6d. a dozen, and the best perhaps 10s. or more. This, of course, is not the price which is paid to the producer; the expenses of shipping and marketing have to be taken into account before the grower in South Africa can reach his customer in England. Nor is it always possible to get at the value of an article sold in an English fruit market merely by deducting so much for market expenses, commission, profit to grower, and so on. There is such a thing as deciding what shall be the market price of goods such as fruit in order to prevent the demand for other goods being lessened by the new supply. It is not always possible for the grower or producer to sell his goods at the price at which he believes he can get a large number of buyers. He has to deal with the factor of the middle-man. It is for that reason among others that Lord Grey’s scheme for a Covent Garden market, open to producers from the Dominions, offers such attractive possibilities. The producer in British Columbia, in Rhodesia, in Australia, in Cape Colony, would come into direct touch with the hostess giving a dinner party in Mayfair, the costermonger driving his barrow down the Old Kent Road, the country parson’s wife in London for a day’s shopping. Fruit would be sold on stalls in the Imperial Covent Garden, owned or controlled by the producer himself, or an association of producers, and the price of fruit from the Dominions would be determined throughout the country at the price at which it could be sold at

headquarters. Without question the demand for such fruit would grow. The big towns, Manchester, Liverpool, Glasgow, Leeds, Bristol, Brighton, would want their depots for Dominion fruit; big, wholesale connections would spring up between Aldwych and the other great urban markets. . . . There arises in imagination a large building, with a central arcade flanked by auction rooms, leading through storing rooms into the broad highways of an artery of roads; the roads lead to the ports, and the ports to the open sea; the ships ride in as they came from Tarshish, with their ivory and apes and peacocks, and along the roads the Dominion produce finds its way to the storing rooms, and so to the arcade of stalls, where the Englishman who has never seen the water of Sydney harbour, or felt the wind blow over the St. Lawrence, or seen the veld of Africa break into flower after rain, may walk and choose the fruit which has ripened under southern suns."

Game Domestication in Rhodesia.

MR. JELLIMAN'S EXPERIMENTS.

We have received a very interesting letter from Mr. A. R. Jelliman, of Jelliman's Rest, Macheke, in which he describes his experiences in domesticating game for farm purposes in this country. He sends also a series of photos of the animals in captivity, one of which, shewing a wagon hauled by donkeys, zebra, eland and oxen, we think must be quite unique. We much regret that the photos are too indistinct for reproduction.

Mr. Jelliman, in the course of his letter, says that as a youngster, long before he ever saw big game, he wondered why they could not be domesticated and made to work. Coming to Rhodesia in 1895, at the time when African Coast Fever first swept the country, he made up his mind to attempt to capture and train game as beasts of burden to take the place of the orthodox mule and donkey, the cost of which was beyond the means of many settlers. He at first met with much discouragement in the venture, and was advised to give up the idea, for, it was said, if he captured the animals he would not be able to keep them alive. Ultimately he was joined by an ex-member of the B.S.A. Police, and after trying several districts, they found sufficient game at the Umvukwe Hills to put their plans into operation. Their method of procedure at first was to attempt to drive the game into an enclosure, but this did not succeed, for the game, after being driven into the wings leading to the entrance, broke through the wire and escaped. Then it was decided to run the game down, and secure the animals by catching them by the tail. This novel procedure worked successfully, and before very long 41 eland, 3 Burchell zebra and 2 mountain zebra were captured. The mortality at first was high, but, with the experience gained,

this decreased very considerably. Three roan and a tsessebe were also captured, but these died. The captured animals were driven to Salisbury, trucked to Macheke, and from there driven to Mr. Jelliman's farm, 11 miles distant. Here they stayed for twelve months, when the animals were sold to Mr. Carl Hagenbeck, an action Mr. Jelliman describes as one of the biggest mistakes he has made in his life. At the farm, Mr. Jelliman goes on to say, the animals were herded by a picanin in the same way as cattle, and on no occasion did they attempt to break their captivity. The ten largest of the eland Mr. Jelliman trained, and he found them much easier to break in than oxen. Each animal took to the yoke at once, and as fast as the ox would trot they would follow. Not one of the animals attempted to use its horns, but they can kick neatly.

Two surviving zebras were trained, and were found to be as fresh as horses, but with no vice in them. Eventually the eland and zebra were sold to Mr. Carl Hagenbeck, of Hamburg, the great collector, at handsome prices.

In conclusion, Mr. Jelliman affirms that he is still a lover of game, and he contends that they can be completely domesticated and used for farm purposes.

The Agricultural Outlook.

20TH MAY, 1913.

Reports from various districts in Mashonaland shew that crops and stocks generally are in a flourishing condition. In a few parts the rains were perhaps late in starting, but in the greater portion of the Territory the conditions have been eminently favourable, and plentiful harvests will be reaped. The season has been propitious for tobacco, and with the increased acreage placed under this crop, the yield this year will probably more than double that of 1912. The quality of the leaf sent in so far is very satisfactory. Pasturage mostly everywhere is abundant, and as far as can be seen little apprehension need be felt with regard to winter feed. Farming in the Hartley district has had a great stimulus in the past year or so, and the coming harvest, although late, is expected to constitute a record. The splendid show of produce at the recent show is ample proof of the potentialities of the district, and will no doubt serve to still further bring Hartley to the front as a farming centre. Matabeleland has not been so fortunate as the sister province, the long-delayed rains being in most cases too late to be of much good to the crops. The rains, however, came in time to avert what might have been a calamity, and although harvests will be below the average, still the position is not nearly so bad as it threatened to be. In the Somabula district, for instance, a very good harvest is expected. A feature of the season was the remarkably rapid improvement in the condition of cattle coincident with the arrival of the rains, and now from all districts reports indicate that stock is doing particularly well. The late rains that fell in most districts ensure better winter feed than there has been during the past year or two, providing, of course, the usual devastating grass fires can be controlled, which there is reason to hope for now that legislation to this effect has been passed. At Gwanda the outlook is not promising, the available grass already beginning to suffer owing to the shortage in the rainfall. The application of the Dog Tax Ordinance is having the desired effect, and throughout the Territory the number of undesirable dogs is being materially reduced.

Departmental Correspondence.

Under this heading we publish correspondence passing between farmers and the Technical Officers attached to the Department of Agriculture, containing points which may be of general interest and assistance to our readers.

MAIZE-HOLDING CAPACITY OF CIRCULAR TANKS.

In reply to an enquiry regarding the capacities of circular tanks for *maize on the cob*, the Assistant Government Agriculturist replied as follows:—

For tanks 6 feet high you require—

- A diameter of 8.5 feet to hold 50 bags maize.
- A diameter of 11.8 feet to hold 100 bags maize.
- A diameter of 19.0 feet to hold 250 bags maize.
- A diameter of 20.8 feet to hold 300 bags maize.
- A diameter of 26.8 feet to hold 500 bags maize.

For tanks 8 feet high you require—

- A diameter of 7.3 to hold 50 bags maize.
- A diameter of 10.2 to hold 100 bags maize.
- A diameter of 16.2 to hold 250 bags maize.
- A diameter of 17.9 to hold 300 bags maize.
- A diameter of 23.0 to hold 500 bags maize.

SHELLED MAIZE.

For tanks 6 feet high you require—

- A diameter of 6 ft. 9 ins. to hold 50 bags shelled maize.
- A diameter of 9 ft. 6 ins. to hold 100 bags shelled maize.
- A diameter of 15 ft. to hold 250 bags shelled maize.
- A diameter of 16 ft. 6 ins. to hold 300 bags shelled maize.
- A diameter of 21 ft. 4 ins. to hold 500 bags shelled maize.

For tanks 8 feet high you require—

- A diameter of 5 ft. 10 ins. to hold 50 bags shelled maize.
- A diameter of 8 ft. 2 ins. to hold 100 bags shelled maize.
- A diameter of 13 ft. 1 in. to hold 250 bags shelled maize.
- A diameter of 14 ft. 4 ins. to hold 300 bags shelled maize.
- A diameter of 18 ft. 6 ins. to hold 500 bags shelled maize.

Correspondence.

FARM BOOK-KEEPING.

To the Editor,

Rhodesia Agricultural Journal.

Sir,

In the February *Journal* you have an interesting article on farm book-keeping. The author states that, generally speaking, it is difficult to allocate the cost of labour on particular crops or works. I beg to enclose herewith a simple form for shewing how the cost of labour can be debited to each branch of work. Most farmers keep a daily diary, and if a form similar to the enclosed is entered up daily, at the same time as the diary is written up, it will give but little trouble, and is sufficiently accurate to be of real value in estimating the cost of labour.

The form is, I think, self-explanatory—the number of boys engaged on particular work being shewn on the line relating to such work. If, say, one boy attends to both pigs and poultry, his time could be entered on alternate days to each section. In “Improvements” I shew two sections—one being permanent works, such as buildings, dams, etc., and the other, such details as clearing, stumping, etc. Permanent buildings being erected could be shewn in a separate column, so as to arrive at the actual labour cost of such building. At the end of the month the columns are cross-totalled, and these cross-totals added together. It is then easy to allocate the costs, *i.e.*, Pigs, $30 \div 600 \times £15 = 15s$.

Where boys are paid at irregular intervals (on tickets) a slip of such payments might be kept in the cash-box and totalled at the end of the month. For the first month, if payments to natives are made at irregular intervals, the actual allocation will, perhaps, be slightly incorrect, but this will adjust itself in later months; and over a period of, say, one

year, this system will very accurately furnish the particulars of expenditure on labour. Cost of food issued can also be included in the same schedule if desired, by adding such cost to the actual cash wages paid out. As some natives are used for mails, cooking, etc., these could be shewn as "general," and their cost either shewn separately or divided amongst the other heads.

Most farmers are very much at sea regarding the cost of labour on various crops, and I think they will find this an easy and simple way of proving to what an extent mere guesswork in such matters is at fault. The form suggested is also an excellent check on undue extravagance in any one direction, and, further, acts as a good guide as to what work can be done by a certain number of natives in a given number of days.

Yours, etc.,

KALERA.

Northern Rhodesia,

27th February, 1913.

[The suggestion is an excellent one. The article was purposely restricted to the simplest essentials necessary in order to give the farmer a correct indication of his financial position. Refinements were avoided, as these tend to discourage beginners. The scheme is obviously capable of extension in many directions, of which that indicated in the above letter is one of the most useful and practical.—Ed., *R.A.J.*]

MONKETOON MELONS AS A CATTLE FOOD.

To J. A. T. Walters, Esq. (Assistant Agriculturist).
Sir,

You may remember that in the course of a conversation a few weeks back, we discussed the value of the Monketoan, or Bechuanaland melon, as a cattle food. Since that date I have received a letter from Dr. C. F. Juritz giving the results of his analyses, and as these may prove of interest to you I am enclosing a copy with this letter. It will be seen from these results that the Monketoan compares very favourably with both the water melon and stock melon, both in food value and yield, as in America stock melons yield from about 20 to 40 tons per acre. There is no doubt that the Monketoan melon does very well here, as it can be relied on to produce a crop in any season. Last year, with a rainfall of barely 11 inches, it did well; and this year, with over four times the amount of rain, it is shewing up very favourably, although the pumpkin crop has been an absolute failure.

		Entire Monketoan. (Av. of two analyses.)	Water Melon.	Stock Melon.
Moisture	... ..	92.39	92.4	94.12
Proteins (N \times 6.25)	...	0.74	0.45	0.5
Fat	... ..	0.75	0.15	0.15
Ash	... ..	0.59	0.25	0.43
Total abds. (including fibre)		5.52	6.7	3.52
Fibre	... ..	2.17	—	1.27
Fuel val. in calories, per lb.—				
Including fibre	... ..	144	142	79
Excluding fibre	... ..	104	—	56
Nutrient ratio	... ..	6.8	—	5.1

Dr. Juritz points out that the fuel value of the Monketoan compares very favourably with that of the American stock melon, due probably to the large amount of fat in the former, and he considers that it might very well be used for feeding

stock generally. It would, however, be advisable to find out whether the melons here are as nutritious as those grown in other localities. Do you think the question of sufficient interest to warrant further analyses?

Yours, etc.,

E. W. LIONEL NOAKS.

[We hope to have something to say regarding this matter in a later issue.—Ed.]

DESTRUCTION OF TREES BY ACID.

To the Editor,

Rhodesia Agricultural Journal.

Sir,

We recently received from Mr. W. Brown Robertson, of "Gomo," Banket Junction, the following letter, and as possibly the contents may be of interest to you we are forwarding a copy herewith:—

"*Re* destruction of trees by acid. I have to inform you as promised that this is satisfactory to a certain point, inasmuch as it kills the tree so that no shoots are sent up. How long the root will take to decay is as yet a matter of doubt, but I am disappointed in this. Slight signs of decay are visible in Mpani and other soft wood trees, but in the ant-proof timbers no sign of decay is to be seen.

The method is as follows:—The tree is cut down in the usual method of clearing, and a hole is bored with an auger in the stump, and the acids poured into the hole in equal proportions, and the hole plugged with a wooden peg and mallet.

A certain amount of care is, of course, necessary in handling such strong acids, but by pouring the sulphuric in on top of the nitric very gently its process is quite safe. To make this

process practical, commercial acid much cheaper than the pure acid quoted to me by you would be necessary. A 3-in. x 6-in. hole is ample to kill a root, but a comparatively large quantity of acid will be required to destroy the root sufficiently for ploughing purposes in a reasonable period, say, a 2-in. x 6-in. hole.

For clearing for grazing purposes, when the death of the tree alone is of importance, the method can be called 'efficient.'

I have treated a few individual stumps with different quantities of acid with a view to seeing what can be done in the way of causing rapid decay of the root, and will report to you if it seems worth while.

I shall be glad to reply to any question you may care to put, or to receive any suggestions you might care to make.

A cheap chemical that will cause the death only of the stump and allow natural decay to do the rest would, of course, be of immense value in this country.

There appears to be no danger from the formation of an explosive body by the action of the nitric acid in the wood cellulose."

Yours, etc.,

LENNON LIMITED

(P. W. SKERRETT, Manager).

[We understand that saltpetre (nitrate of potash) used in the same way as above-described with sulphuric and nitric acid, in a few weeks reduces the wood to a tinder which, when ignited, slowly burns away.—Ed.]

NOTES ON FRIESLAND CATTLE IMPORTED INTO LOMAGUNDI DISTRICT FROM CAPE COLONY.

To the Editor,

Rhodesia Agricultural Journal.

Sir,

I will be glad if you will correct the obvious error in the description of my bull in the April issue of the *Journal*. The

description should read:—"Friesland bull 'Grafter' (sire, Syverd; eleven firsts and ten championships, Cape and Free State shows). Imported into Rhodesia February, 1909."

Yours, etc.,

JAMES W. STRUTHERS.

Palm Tree Farm,
P.O. Umboe,
7th May, 1913.

BEES.

To Fred. Sworder, Esq.

Sir,

In a pigeon coop at the top of a pole 14 feet high there is a swarm of bees that have defied my efforts to remove them for years. Every means short of destroying the pigeon coop have been tried—smoke, fire, gunpowder, paraffin and Cooper's Dip. At last I have to accept defeat, and have come to a decision that it would be far more sensible to turn these bees into friends rather than continue treating them as a pest. They have killed and injured puppies, fowls, pigeons, and cleared everybody out of the place two or three times. Now I want to know how to make use of them, if possible, and should be very glad if you will tell me how to proceed—from the start until they are safely hived. I know absolutely nothing at all about the proper treatment of bees, nor the bee appliances. Can you help me?

Yours, etc.,

C.S.H.

Reply.

I will endeavour as far as possible to help you, but to ensure success on all points your particular case should be dealt with by someone who is accustomed to handling bees and who understands them. The fact that the bees have been in the pigeon coop for years is proof enough that your district is favourable for bee-keeping and the production of honey. The cause of the bees doing damage to poultry, dogs, etc., and com-

pellings people to seek shelter during their maddened career, is due to the heat of the sun. Although it was their own selection, their abode is unsuitable, and provided they can be removed and placed in a frame hive and set under a shady tree, they will not give further trouble to man or beast. I have repeatedly been called upon to render help, and have carried out similar undertakings with success. If you really intend that the bees are to be removed from the pigeon coop and placed in a frame hive for the purpose of procuring honey in a marketable form or for household use, my advice is that you should purchase from someone who sells bee appliances one complete frame hive of a recognised pattern, stipulating that the frames in the brood chamber are to be fitted with full sheets of brood foundation (wax combs) and wired. Also procure a good smoker and a bee veil. Upon arrival of these goods, secure from the chemist a bottle of Calvert's No. 5 carbolic acid, and on a conveniently cool day, about 7 o'clock in the morning, freely sprinkle this substance (undiluted) in the many entrances of the pigeon coop, but not actually on the inmates. As bees have a great aversion to the smell of carbolic acid, it will not be many minutes before they are compelled to forsake their old home. Apparently you tried everything but the right remedy. During the flight of the bees carefully follow them and mark the spot, which will not be far distant, where they settle. Should there be trees close at hand, there is every probability that they will cluster on one of their branches, and if it is within easy reach cut it off quietly, gently carrying the branch with the adhering cluster to the hive, which latter is to be previously placed in a shady spot, then place the branch on the alighting board of the hive, as close as possible to its narrow entrance. The swarm, for such it now is, should be shaded with the hive roof or piece of sacking to prevent it flying away. The scent of the wax combs will induce the bees to take possession of their new home, and being already filled with honey, they will be harmless. The frames of the hive must be previously covered with the quilts supplied with it, or some warm clothing, to prevent the bees gaining access to the roof of the hive and also to promote warmth. Should you have the bees successfully, I think they will be able to collect a sufficient quantity of food to carry them through the winter, otherwise they must be fed. Any swarms which in future take possession

of the pigeon coop should be treated as above described, and as you gain experience and confidence in handling bees I believe that you will have no cause to regret having treated the bees as friends. As far as I am aware, few stores in Rhodesia make a point of stocking bee appliances, so I will give you the names and addresses of those firms in whom I have every confidence, and who make it a study to supply up to date bee goods of the best quality, and to whom I would advise you to write for catalogues with prices. Useful hints on bee-keeping are usually to be found therein. These firms are:—Messrs. Henwood, Market Square, Johannesburg; Mr. H. F. Bengert, 30, Loveday Street, Johannesburg; and Messrs. Cairncross and Zillen, Pretoria.

The South African Bee-Keepers' Association, Box 3653, Johannesburg, publishes a monthly journal giving information on all matters connected with bee-keeping in South Africa. Membership fee, 12s. 6d. per annum. This includes the S.A.B.K. Association's journal. Should you need further hints I shall be pleased to supply them.

I should mention that the smoker should be used previous to sprinkling the carbolic acid, by giving good puffs when it is well alight. Good brown paper burns as well as anything.

FREDERICK SWORDER.

Veterinary Report.

March, 1913.

SALISBURY.

AFRICAN COAST FEVER.—No fresh outbreaks, and no further cases at the infected farm, The Grange.

MALLEIN TEST.—A local horse, shewing symptoms somewhat suspicious of glanders, was tested with mallein, with negative results.

BULAWAYO.

AFRICAN COAST FEVER.—At Collaton five head were destroyed, and in each case the existence of the disease was confirmed on *post-mortem* examination. Total mortality to date, 416 head. The infected herds are regularly temperatured and three-day dipping continued.

MALLEIN TEST.—The following animals were tested with mallein on importation and found free from glanders (Plum-tree included):—Horses 2, mules 19, donkeys 273.

HORSESICKNESS INOCULATION.—Twenty-five mules inoculated. No deaths.

IMPORTATIONS.—Bulls 6, heifers 90, sheep and goats 5,331.

UMTALI.

AFRICAN COAST FEVER.—No fresh outbreaks, and no cases on the infective section of the commonage, on which the last death occurred in March, 1912.

REDWATER AND GAILSICKNESS.—Several deaths from these diseases were reported and enquiry made.

IMPORTATIONS.—Thirty-six head of slaughter cattle from Macequece.

GWELO.

MALLEIN TEST.—Four horses were tested with mallein on importation and found free from glanders.

HORSESICKNESS INOCULATION.—Seven mules were inoculated. No deaths.

MELSETTER.

Eight head of cattle illegally introduced from Portuguese territory were destroyed.

UMVUMA.

RABIES.—A dog suspected of being affected with rabies was destroyed, and the head forwarded to the Veterinary Laboratory for examination. Unfortunately it was too far decomposed on arrival to render examination possible.

ENKELDOORN.

BLUE TONGUE IN SHEEP.—This disease appeared amongst several flocks, and, notwithstanding the injection of blue tongue vaccine, a considerable mortality occurred.

GENERAL.

HORSESICKNESS.—A very heavy mortality from this disease occurred in all districts of Mashonaland and in several districts in Matabeleland.

J. M. SINCLAIR,

Chief Veterinary Surgeon.

Veterinary Report.

April, 1913.

SALISBURY.

AFRICAN COAST FEVER.—No fresh cases on the existing centres of infection, viz., the farm Grange and Salisbury commonage. A fresh outbreak occurred on one of the Hatfield plots adjoining Salisbury commonage. Out of eight head in the infected herd, six died or were destroyed. In each case the existence of Coast fever was determined.

MALLEIN TEST.—The horse referred to in the report for the previous month was re-tested, with negative results.

IMPORTED PURE-BRED STOCK.—Four bulls and four heifers, pure-bred Shorthorn, arrived at the Veterinary Laboratory from England and were subjected to the tuberculin test, with negative results. They were subsequently inoculated with redwater and gallsickness virus; marked redwater reactions occurred. The gallsickness reactions are not expected for some time yet.

BULAWAYO.

AFRICAN COAST FEVER.—At the Collaton infected centre four animals were destroyed on shewing a rise of temperature. The existence of Coast fever in each case was demonstrated *post-mortem* or microscopical examinations.

MALLEIN TEST.—The following animals were tested with mallein on importation without any reaction (includes Gwanda):—Horses 13, mules 25, donkeys 241.

UMTALI.

AFRICAN COAST FEVER.—Towards the end of the month a fresh outbreak of this disease occurred on Mr. Strickland's farm N'Odzi, six animals being affected. Fortunately the farm is completely fenced and a dipping tank available, and it

is hoped with three-day dipping that the disease will be controlled and its extension prevented. Very few movements of cattle to this farm have taken place during the last twelve months, but there is no reason to suspect that infection was introduced by any of these. Several calves died during the last two seasons, and it is probable that the disease has existed in an enzootic form for some time.

GWELO.

HORSESICKNESS INOCULATION.—Twelve mules inoculated. No deaths.

VICTORIA.

RABIES.—A suspected case of rabies occurred at the Empress Mine. The rabies regulations were put in force within a radius of 15 miles of the seat of the suspected outbreak.

HORSESICKNESS INOCULATION.—Three mules were successfully immunised.

UMVUMA.

RABIES.—Two suspected cases of rabies reported.

SELUKWE.

RABIES.—One suspected case reported.

GENERAL.

No infective disease reported from any of the other districts.

HORSESICKNESS.—The heavy mortality from this disease continued during the month.

J. M. SINCLAIR,

Chief Veterinary Surgeon.

Market Reports.

26th May, 1913.

The season's crops are now coming in, and the produce market in Salisbury is generally well supplied. On the morning market, vegetables are getting scarce, but potatoes are plentiful. There is a good supply of local butter. Eggs are still very scarce, and supplies find ready sale at good prices. There is a quiet demand for mules, and a fairly good enquiry for donkey mares. There is an exceptional demand for breeding cattle and trek oxen throughout the country, and high prices are being paid, as instanced by the recent sales conducted by Messrs. Whitfield & Co.

Article.	Johannesburg.		Kimberley.		Bulawayo.		Salisbury.	
Barley, 150 lbs. -	13/0	14/0	12/0	14/0	—	—	27/6	30/0
Beans, 203 lbs. -	18/0	27/0	32/6	35/0	—	—	25/0	27/6
Boer Meal, unsifted, 200 lbs. -	—	—	26/6	27/0	43/0	44/0	40/0	—
Bran, wheaten, 100 lbs. -	8/0	8/3	6/9	7/3	12/0	13/0	17/0	—
Flour, 100 lbs. -	—	—	—	—	—	—	—	—
„ Colonial, 100 lbs. -	—	—	15/0	16/0	23/6	24/6	none	—
Forage, 100 lbs. -	3/0	5/9	4/3	5/6	10/6	11/0	7/6	8/0
„ Colonial Oat -	5/6	5/9	—	—	—	—	—	—
Hay -	Bale. 7d. 9d.		—	—	Ton. 60/0 65/0		Ton. 35/0 40/0	
Kaffir Corn, 200 lbs. -	19/0	21/0	18/6	20/0	28/0	29/0	none	—
Manna, 100 lbs. -	2/3	3/9	—	—	—	—	none	—
Mealies, S.A. White, 203 lbs. -	12/0	14/0	19/6	20/6	21/0	22/0	17/6	18/0
Mealies, Yellow, 203 lbs. -	14/0	15/0	17/6	18/0	20/0	21/0	none	—
Mealie Meal, White, 183 lbs. -	—	—	20/6	21/6	—	—	17/6	20/0
Munga, 200 lbs. -	—	—	—	—	—	—	25/0	—
Monkey Nuts, bag -	—	—	—	—	15/0	17/6	15/0	16/0
Oats, 150 lbs. -	12/0	12/6	10/9	11/0	21/6	22/6	25/0	26/0
Onions, 120 lbs. -	10/0	12/6	6/0	9/0	16/0	18/0	22/6	25/0
Peas, 200 lbs. -	14/0	15/0	—	—	—	—	40/0	—
Potatoes, new, 150 lbs. -	10/0	12/0	10/0	12/6	17/6	21/0	10/6	11/0
„ old, 150 lbs. -	5/0	9/0	8/0	9/6	—	—	none	—
Rapoko -	—	—	—	—	—	—	17/6	20/0
Rye, 200 lbs. -	18/0	18/6	—	—	—	—	—	—
Salt, 200 lbs. -	—	—	—	—	10/6	11/0	11/6	12/6
Wheat, 203 lbs. -	21/0	24/0	22/6	24/6	—	—	30/0	—
Butter, local, per lb. -	9d.	1/0	8d.	1/0	1/3	1/6	1/9	2/0
Eggs, local, per dozen -	1/4	1/8	1/0	1/9	3/6	3/9	4/6	—
Ducks, each -	1/9	3/0	2/0	3/0	—	—	3/6	4/6
Fowls, each -	1/9	3/0	1/0	2/0	1/10	2/2	2/6	3/6
Geese, each -	3/0	4/0	3/6	4/0	—	—	9/0	11/0
Turkeys, cocks, each -	5/0	15/0	7/0	10/0	—	—	13/6	15/0

LIVE STOCK.

Slaughter Cattle, 100 lbs. -	36/0	38/6	—	—	37/6	40/0	40/0	42/6
Trek Oxen, trained -	£8/10	£9/10	—	—	£8/10	£12	£10/10	£11/10
Local Cows, milk -	—	—	—	—	£25	£30	£25	£30
Dairy Cows -	£16	£35	—	—	£25	£35	£25	£35
Native Cows -	—	—	—	—	£7	£9	£8/10	£9/10
Heifers, Colonial -	£5	£7/10	—	—	£10	£17	£9	£11
„ Native -	—	—	—	—	£4	£6	£5	£6
Pigs, live weight -	2d.	5½d.	—	—	—	—	4d.	—
Horses, riding, salted -	—	—	—	—	—	—	£40 (good)	—
„ „ unsalted -	£10	£21	—	—	£15	£35	£22/10	£30
Mules, inoculated -	£12/10	£25	—	—	£35	£40	£25	£30
Donkeys, geldings -	£5	£6	—	—	£8/10	£10/10	£6/10	£8
„ mares -	—	—	—	—	—	—	£8/10	£10
Goats -	9/0	11/0	—	—	—	—	12/6	17/6
Persian Ewes -	—	—	—	—	—	—	22/6	25/0
Cross-bred Ewes -	16/0	19/0	—	—	—	—	—	—
Sheep, slaughter -	—	20/0	—	—	18/6	20/0	22/6	25/

Garden Calendar.

June and July.

By N. L. KAYE-EDDIE.

THE FLOWER GARDEN.

During these cold dry months, most plants are at a standstill, and but little growth is made. Watering has to be resorted to in order to keep delicate and small plants alive. The soil should be well dug and manured, and kept constantly stirred and as loose as possible, especially where watering has been done. Seeds of most annuals for early flowering may be sown in boxes, but these will require constant watering before the coming rainy season. The boxes should be placed in a warm place, sheltered from the wind—a good plan is to make a pit and cover the top with calico. Perennials, shrub and ornamental tree seeds may also be sown. Dahlia and other flowering bulbs should be taken up, and stored for division and replanting whilst the soil is being prepared. Fruit trees, shrubs, and roses should be pruned, and all the waste and dead wood removed.

Sweet Peas should be well attended to, constantly cultivated, manured and staked. When starting to climb, they should be slightly ridged, which will help to this purpose.

Carnations.—No garden should be without this very popular and beautiful flower. The Marguerite varieties flourish especially well in Rhodesia, and with attention will flower throughout the year. They are easily raised from seed or cutting, and grow in almost any situation. Constant picking, and not allowing seed to form adds to their life and vigour.

Dahlias.—The bulbs should be broken up and replanted. Care should be exercised in this operation, which is a difficult one. Each bulb to grow must have an eye, which is situated on the crown of the old stem, part of which must be cut away with each bulb; the thin neck of the bulb should in no way be damaged. The dahlia requires only a poor but deep soil, and should never be heavily manured, or the plant will run to wood. The cactus varieties do exceedingly well in this country.

All plants in tins or pots requiring repotting should now be attended to. A good compost can be made of ordinary garden soil, sand, and leaf mould in equal parts, and, where specially required, a little well-rotted manure may be added. Rotten chips under the wood stack will do instead of leaf mould.

THE VEGETABLE GARDEN.

All the available space in the garden should now be thoroughly trenched and manured, the soil being well worked and loosened. Vegetables planted out for winter crops should be well and continuously cultivated, which will help to bring them along quicker and with less watering. Late-bearing tomatoes should be sheltered from the cold winds by a grass shield. Beans should be staked and tied. Beet, radish, carrot, parsnip, turnip, onion, leek, mustard, cress, and tomatoes may be planted. Potatoes may be planted by those who are fortunate enough to have sufficient water.

Weather Bureau.

TEMPERATURES.

STATION	MARCH		APRIL	
	Max.	Min.	Max.	Min.
MASHONALAND—				
Charter, Grootfontein ...	80·0	52·2	—	—
Hartley, Giant Mine ...	83·77	58·19	82·5	56·1
„ Hallingbury Farm ...	80·0	58·2	79·8	56·1
Lomagundi, Sinoia ...	82·9	52·0	83·0	—
Melsetter, Government Offices ...	70·6	54·7	70·1	54·7
„ Mount Selinda ...	73·0	57·7	73·1	57·7
Salisbury, Agricultural Laboratory ...	76·0	56·7	75·0	55·0
„ Chishawasha ...	76·4	57·9	75·4	56·0
„ The Gaol... ...	77·1	57·0	76·3	54·9
„ Shamva Mine ...	78·1	59·6	—	—
Umtali, Chiconga's Location ...	80·9	60·8	—	—
„ Summerfield ...	71·6	56·1	70·9	55·0
Victoria ...	77·4	58·5	77·8	—
MATABELLELAND—				
Bulawayo, Essexvale ...	82·83	60·22	76·33	58·36
„ Observatory ...	79·9	57·5	76·7	57·0
„ Rhodes Matopo Park... ..	83·0	57·2	77·8	55·8
Gwelo, The Gaol ...	81·5	56·6	76·0	55·7
Mangwe, Empandeni ...	83·8	59·9	80·1	57·8
Tuli, Police Camp ...	93·3	66·2	87·6	63·5

RAINFALL.

STATION	March.	April.
MASHONALAND :		
Charter—		
Driefontein	1·06	3·82
Enkeldoorn	1·44	1·73
Grootfontein	·66	x
Marshbrook	2·67	2·66
The Range	1·88	1·67
Rhodesdale Estate	1·34	x
Riversdale	3·17	3·08
Umvuma (Railway)	2·75	x

RAINFALL—(Continued).

STATION				March.	April.
MASHONALAND—(Continued)					
Hartley—					
Ardgowan	...	...	...	2·65	2·88
Battlefields (Railway)	...	...	...	2·18	3·07
Carnock Farm	...	...	...	1·50	3·51
Elandsfontein	...	...	...	1·84	4·15
Elvington	...	...	...	4·48	3·68
Franceys	...	...	...	1·84	2·99
Gatooma	...	...	...	2·81	3·70
Gatooma (Railway)	...	...	...	3·16	x
Giant Mine	...	...	...	4·01	1·66
Gowerlands	...	...	...	1·51	2·88
Hallingbury	...	...	...	5·83	1·40
Hartley (Gaol)	...	...	...	4·08	x
Hartley (Railway)	...	...	...	3·85	3·25
"Jenkinstown"	...	...	...	1·86	2·19
Makwiro	...	...	...	3·36	3·45
Shagari	...	...	...	3·40	2·27
"Stoneygate"	...	...	...	5·18	2·65
Lomagundi—					
Banket Junction (Railway)	...	...	...	4·51	2·35
Darwendale	...	...	...	4·34	3·40
Duxbury Farm	...	...	...	5·29	4·24
Eldorado (Railway)	...	...	...	4·80	x
Kanyemba	...	...	...	x	x
Lone Cow Estate	...	...	...	4·58	x
Palm Tree Farm	...	...	...	5·49	3·64
Sipolilo	...	...	...	5·05	·27
Sinoia	...	...	...	4·64	3·31
Makoni—					
Eagle's Nest	...	...	...	3·43	4·47
Inyanga	...	...	...	2·73	5·41
Monte Cassino	...	...	...	2·25	7·50
Rusape	...	...	...	2·90	3·59
Rusape (Railway)	...	...	...	2·87	x
York Farm	...	...	...	4·88	8·39
Mangwendi—					
Bonongwe	...	...	...	4·16	2·76
Glen Somerset	...	...	...	4·07	2·31
"Good Hope"	...	...	...	3·93	3·79
Land Settlement Farm	...	...	...	3·90	x
Macheke (Railway)	...	...	...	1·50	x
Marandellas	...	...	...	3·44	x
Marandellas (Railway)	...	...	...	3·76	x
Mrewa	...	...	...	5·26	2·31
Mtoko	...	...	...	3·94	·16
Mungo Estate	...	...	...	1·98	3·21
Rusawi (Outspan)	...	...	...	3·09	x
Selous Nek	...	...	...	3·81	1·72
Tweedjan	...	...	...	5·15	6·59
Mazoe—					
Avonduur	...	...	...	4·90	1·01

RAINFALL—(Continued).

STATION			March.	April.
MASHONALAND—(Continued)				
Mazoe (Continued)				
Bindura	...	...	8.94	x
Chin Mine, Mount Darwin	...	...	3.94	.32
Claverhill	...	...	4.11	2.29
Dunmaglas	...	...	5.87	1.36
Lagnaha	...	...	7.19	x
Lowdale	...	...	3.38	x
Mazoe, Native Commissioner's Office	...	...	4.06	2.84
Mount Darwin	...	...	2.91	.45
Omeath	...	...	6.83	1.00
Sleamish	...	...	9.61	1.35
Sunnyside	...	...	6.90	3.87
Teign	...	...	6.62	1.98
Umvukwe Flats	...	...	6.16	x
Melsetter—				
Chikori	...	...	5.04	x
Chipinga	...	...	6.83	3.53
Helvetia	...	...	x	7.29
Mutambara Mission	...	...	3.80	x
Melsetter	...	...	6.16	2.86
Mount Selinda	...	...	7.46	4.81
Tom's Hope	...	...	8.35	4.18
Vermont	...	...	9.60	x
Salisbury—				
Agricultural Laboratory	...	...	3.41	.96
Avondale	...	...	4.70	1.22
Brookmead	...	...	3.22	x
Chishawasha	...	...	5.30	3.11
Cleveland Reservoir	...	...	4.49	1.90
Convent	...	...	4.85	x
Goromonzi	...	...	2.80	2.83
Hillside	...	...	3.56	1.32
Meadows	...	...	2.94	5.90
Public Gardens	...	...	4.76	1.32
Rhodesville	...	...	4.16	x
Salisbury (Club)	...	...	x	.56
„ (Gaol)	...	...	5.23	1.38
„ (Railway)	...	...	5.56	x
Shamva	...	...	8.45	1.33
„ Mine	...	...	6.57	1.90
Stapleford	...	...	x	x
Westridge	...	...	4.32	x
Umtali—				
Chiconga's Location	...	...	3.48	x
Champion Mine	...	...	x	x
Gaol	...	...	x	x
Odzi	...	...	4.70	x
Premier Estate	...	...	2.99	3.63
Selim Mine	...	...	3.58	4.63
Summerfield	...	...	6.01	3.89

RAINFALL (*Continued*).

STATION				March.	April.
MASHONALAND—(Continued)					
Umtali (Continued)					
Umtali (Railway)	...	...	...	5.18	4.68
Utopia	...	...	...	5.70	5.64
Victoria—					
Chibi	...	...	...	2.82	x
Chilimanzi	...	...	...	2.06	4.12
Chingombie	...	...	...	2.59	x
Chiredzi Ranche, Ndanga	...	...	...	1.76	3.25
Empress Mine	...	...	...	2.16	3.35
Gokomere	...	...	...	2.77	1.14
Gutu	...	...	...	1.90	2.74
Halliday's Farm	...	...	...	1.42	4.03
Marah Ranche	...	...	...	3.47	3.53
Marthadale	...	...	...	2.25	3.01
Morgenster	...	...	...	4.68	x
Noeldale	...	...	...	3.56	2.19
Pamushana	...	...	...	5.54	3.43
Silver Oaks	...	...	...	1.33	2.79
Victoria	...	...	...	1.87	2.30
MATABELELAND :					
Belingwe—					
Dawn Farm	} Native district of Insiza.			.87	2.55
Filabusi				.20	1.08
Fort Rixon				.51	1.35
Infiningwe				.48	.11
Insiza (Railway)				2.50	2.43
Thornville				1.67	4.85
Shangani (Railway)	...	...	...	1.13	x
Tamba	...	...	...	x	x
Bubi—					
Inyati	...	...	...	1.26	x
Bulalima—					
Figtree	...	...	...	1.11	1.21
Magot	...	...	...	.38	2.40
Marula	...	...	...	x	x
Plumtree	...	...	...	x	x
Solusi	...	...	...	x	x
Syringa	...	...	...	.11	2.22
Tegwani	...	...	...	1.5	4.14
Bulawayo—					
Balla Balla (Railway)	...	...	...	.33	1.82
Bembesi (Railway)	...	...	...	1.96	2.70
Dewhurst	...	...	...	x	x
Edwaleni	...	...	...	x	x
Essexvale	...	...	...	.27	1.10
Government House	...	...	...	.06	x
Gwaai (Railway)	...	...	...	.84	x
Heany Junction (Railway)	...	...	...	.45	x

RAINFALL (*Continued*).

STATION			March.	April.
MATABELELAND—(Continued)				
Bulawayo (Continued)				
Hope Fountain	...	...	·14	2·35
Imbesa Kraal	...	...	·05	1·06
Khami	...	...	·45	2·41
Lochard Experiment Farm	...	...	1·83	1·67
Matopo Mission	...	...	1·51	3·12
Maxim Hill	...	...	·52	·92
Melinakanda Junction	...	...	·09	x
Mpondeni	...	...	x	x
Nyamandhlovu	...	...	1·25	0·83
Observatory	...	...	·23	1·03
Pendennis	...	...	·01	3·31
Raylton	...	...	·27	x
Rhodes Matopo Park	...	...	·40	3·12
Umgusa	...	...	·30	2·90
Gwanda—				
Antelope Mine	...	...	·03	3·27
Gwanda (Gaol)	...	...	·04	1·42
„ (Railway)	...	...	·01	·13
Malundi	...	...	·07	1·25
Mtshabzi Mission	...	...	·27	1·75
West Nicholson (Railway)	...	...	·16	2·0
Gwelo—				
Globe and Phoenix (Railway)	...	...	1·64	x
Gwelo (Gaol)	...	...	1·12	2·16
Gwelo (Railway)	...	...	1·12	x
Lalapanzi	...	...	1·13	2·14
Lower Gwelo	...	...	1·62	3·3
Que Que	...	...	1·53	2·86
Selukwe (Railway)	...	...	2·49	x
Shawlands	...	...	1·30	2·19
Mangwe—				
Empandeni	...	...	1·15	1·83
Garth	...	...	·83	3·17
Sebungwe—				
Gokwe	...	...	1·83	x
Tuli—				
Lamulas	...	...	·62	2·18
Makalali	...	...	·18	1·64
Manantji	...	...	—	2·45
Manyoni	...	...	·17	1·20
Mazunga	...	...	·08	2·53
Tuli	...	...	·77	1·26
Wankies—				
Malindi (Railway)	...	...	·74	1·19
Victoria Falls (Police Camp)	...	...	·13	1·57
Victoria Falls (Railway)	...	...	·50	x
Wankies Hospital	...	...	·10	2·23
Wankies (Railway)	...	...	·09	x

x No return received.

Dates of Meetings of Farmers' Associations, Southern Rhodesia

(SUBJECT TO ALTERATION)

Name of Association	Place of Meeting	Secretary	1913		
			June	July	Aug.
Bindura	Thurlow's Hotel	S. E. Ford	..	13	..
Central	Beatrice Mine	W. Krienke	..	30	..
Enterprise	Unvuma..	C. Napier	27	25	29
Figtree Branch, R.L. and F.A.	Arcturus Hotel	R. Philip	10	8	12
Gatooma	Figtree Hotel	A. Curtis	..	..	9
Gazaland	Gatooma	R. F. Thomas	..	..	..
Hartley	Chipinga	L. Dobell	..	..	..
	Commercial and Flanders Hotels,				
	Hartley, alternately				
Headlands	Headlands Siding	L. Savory	7	31	9
Insiza	Insiza Station	J. Harvard	7	26	9
Lalapanzi	Lalapanzi Hotel	N. C. St. J. Breslin	20	12	..
Louagundi	Sinoia	B. Smith	..	18	15
Macheke	Macheke	J. N. Bateman	..	19	..
Makoni	Rusape	H. H. Kidson	..	5	..
Makwiro	Makwiro	W. S. Tapson	21	19	16
Manica	Xmas Pass Hotel	A. B. Fraser	7	5	2
Marandellas	Marandellas	J. S. Holland	7	5	2
Maugwendi	Fixed every meeting	C. M. Wright	7	2	..
Marula	Marula Siding	MacW. Ingram	28	26	30
Mashonaland	Langham Hotel, Salisbury	W. H. Williamson	7	5	2
Matopo Branch, R.L. and F.A.	Malindi Hotel	W. E. Dowsett	7	2	..
Mazoe	Various Farm Houses		Meetings called when desired		
Melsottier (North)	Gwelo	N. Rutherford	7	..	..
Midlands	Ram. O. H. Bieurtion	R. O. H. Bieurtion	14	12	9
Northern	Plantree	H. J. Brooke	14	12	9
Plantree	Globe & Phoenix Hotel	E. E. Somerset	21	19	16
Que Que	Bulawayo	H. S. Hopkins	27	25	29
Rhodesian Landowners and Farmers	Shamva	J. M. Moubray	No dates	dates	fixed
Shamva	Farm. Fairview"	S. Annandale	7	5	2
Sonabuta and Shangani Flats	Victoria	J. Rutherford	18	16	20
Selukwe	Selukwe	F. S. Clark	Once a quarter		

Departmental Notices.

Information for Farmers

The Department of Agriculture is prepared to furnish to farmers technical advice either by correspondence, or, where possible, by personal visits. All communications should be addressed in the first instance to the Director of Agriculture.

Crops

The Agricultural Branch deals with enquiries relating to agricultural practice, soils, crops, cultural operations, processes, seeds, trees, farm implements and machinery, etc.

Poisonous Plants

It is of great importance that as soon as possible a study should be made of those plants found in Southern Rhodesia which are poisonous or deleterious to small or large stock. Farmers and others who have known, or suspected poisonous plants on their property, are requested to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, at the same time forwarding specimens of the plant, including stem, leaves, flowers, and, where possible, fruit. Any particular regarding the habits of the plant will be welcomed, and in return the Department will supply all available information regarding the plants.

Disposal of Seeds

All farmers and others who have surplus supplies of good quality locally grown farm seed of any description are invited to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, stating what

quantities are available for sale, and price f.o.r. nearest station. In all cases representative samples of the grain must accompany the letter, but need not exceed two ounces in weight.

The Agricultural Department is continually receiving enquiries as to where various seeds can be obtained, and it is hoped that by the above means growers of reliable seed may be brought into touch with one another.

It must be clearly understood, however, that beyond recommending sources of supply, the Department cannot take any further part in the transaction.

Tobacco

The services of the Tobacco Expert are available to all desiring advice on the subject. Applications should be accompanied by particulars of the nature of the information sought, also the distance and direction of the farm from some well known centre.

Live Stock

The Animal Industry Branch is prepared to advise with regard to all matters connected with stock breeding, selection, feeding and registration of stud animals, the dairy industry, poultry management, farm buildings for stock, and kindred subjects. Buyers and sellers of stud stock in Rhodesia are also put in touch with one another.

Purchase of Stock in the Cape and Free State Provinces of the South African Union, on behalf of Farmers resident in Southern Rhodesia

The following amended arrangements are published for general information :—

The Government undertakes the purchase of pure-bred live stock for farmers on the conditions outlined below, and on the following terms of payment, viz. :—(1) a deposit on application; (2) one-third total cost on delivery, less amount of

deposit; (3) one-third after six months, and (4) one-third after twelve months—both these instalments bearing interest at 6 per cent. or 10 per cent. if not paid at due date. These terms of credit will only be allowed on purchases up to a total maximum value of £200; sums exceeding that amount are payable in cash along with the first instalment. The Government reserves the right to refuse, without reason given, applications, or to fulfil purchases even after deposit has been made. Applications must be on the prescribed Form "A," and all conditions complied with before same is registered. Applications will be considered in rotation, but fulfilled as opportunity serves, so that animals may be procured as cheaply as possible. The buyer must undertake to accept the animal allotted to him, unless it fails to satisfy description as given in the application form. Disputes may be submitted to arbitration. The purchase price will include all expenses up to time of delivery, price paid to original owner, commission and charges of buyer and freight, including, where necessary, attendance and keep on journey. With every application a deposit must be forwarded; £1 per head in the case of cattle, horses and donkeys, and 5s. per head for sheep, goats and pigs. Such deposit will be deducted from the amount of the first instalment due, but may be forfeited in the event of the application being withdrawn after having been registered. Stock is not to be disposed of without the written consent of the Director of Agriculture until payment is completed.

Purchases will be made by the Department of Agriculture through its authorised representatives. Every effort will be made to secure animals in accordance with particulars furnished by applicants, and to the best advantage. All purchases must conform strictly to the importation regulations as regards age and freedom from contact with contagious disease. Pedigrees, if obtainable, will be supplied. The Government will bear all risks of transport and of death from any cause until delivery, all losses being chargeable to the vote. All animals failing to pass the necessary test on arrival shall be destroyed and the loss borne by the Government, and another animal purchased for the applicant.

Prospective buyers will be advised of the probable cost. The Department does not undertake to purchase stock at precisely the prices specified by applicants, but will endeavour to

approximate as nearly as possible to the figures given and not to exceed same by over 20 per cent. The authorised representatives of the Department will be allowed a reasonable commission, with expenses additional.

The first instalment will become due and payable on delivery. Applicants or their agents will be advised regarding arrival of their stock, after which all responsibility on the part of the Department will cease.

Entomology

The Government Entomologist advises on matters connected with insect pests of live stock, crops, and fruit trees, and also undertakes the inspection of nurseries and of the importation of plants from abroad.

Chemical Analyses

The Government Agricultural Chemist deals with matters relating to the composition of soils, fertilisers, farm produce of vegetable or animal origin; also the investigation of poisons and of articles of potential economic value.

Nominal charges are made, which, while not covering the cost, will help to defray the expense and serve as a proof of good faith. Samples, carriage prepaid, together with full particulars regarding the subject should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

A schedule of charges and directions for taking samples will be furnished on application.

With all analyses, reports will be furnished explanatory of the results and, when possible, advice given as to the nature, properties and value of the material.

No charge will be made for analysis where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Services of Government Veterinary Surgeons

1. The services of Government Veterinary Surgeons are available to the public, free of charge, for the following purposes only :—

- (1) Attending and giving professional advice in connection with the following diseases, viz. :—Anthrax, Contagious abortion, East Coast Fever, Epizootic Lymphangitis, Foot and Mouth Disease, Farcy, Foot-rot, Heartwater, Glanders, Intestinal parasites amongst sheep and goats, Liver Disease, Lungsickness, Osteo Porosis, Malarial Catarrhal Fever (blue tongue), Rabies, Redwater, Rinderpest, Scabies, Sponzielte (quarter evil), Swine Fever, and any other diseases which may in future be scheduled in terms of section 3, sub-section 18 of the "Animals Diseases Consolidation Ordinance, 1906." Attending to cases of disease amongst live stock which, though not of a contagious or infectious character, may be of general public importance.

- (2) Applying tests in regard to Glanders, Tuberculosis, or any other disease against the introduction or spread of which tests are applied under regulations.

- (3) Inoculations against the following diseases :—

Horsesickness, Lungsickness, Anthrax, Quarter Evil, Redwater, Malarial Catarrhal Fever (blue tongue). A fee to cover the cost of serum and virus will be charged.

2. The following charges shall be made and payable for services rendered by the Government Veterinary Surgeons in other cases, viz. :—

	£	s.	d.
(1) For every professional visit within three miles of his office or residence	0	5	0
(2) For every professional visit beyond such distance	0	10	6
plus an additional charge of 2/6 per hour whilst engaged in such visits or £2/2/0 a day of 24 hours;			

	£	s.	d.
(3) For advice given at the Veterinary Surgeon's office, for each animal, per visit	0	2	6
(4) The following to be charged in addition to visiting fees :—			
a. For every examination as to soundness, each	1	1	0
b. For castration, horses, each	1	1	0
c. For castration, bulls, each	0	5	0
d. For castration, donkeys, each.. ...	0	10	6
e. For parturition cases, mares, each	2	2	0
f. For parturition cases, cows, each..	1	1	0
g. For other operations, according to nature, from 5/- to £2/2/0.			

3. Double the above fees will be payable for services rendered on Sundays, public holidays, and between the hours of 7 p.m. and 7 a.m.

4. Applicants for the services of Government Veterinary Surgeons must at their own cost provide the necessary transport for the conveyance of these officers from, and back to, their residence or nearest railway station.

5. Farmers and owners of stock throughout the country frequently telegraph for a Government Veterinary Surgeon to be sent to attend an animal which has been taken seriously ill. It is rarely possible to comply with these requests at once, as the Veterinary Surgeon may be engaged on duty which he cannot leave, or is at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any service in an urgent case. Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the veterinary staff discredited. To obviate this, in all cases where veterinary advice and assistance are required, the owner should telegraph to "Veteran," Salisbury, with prepaid reply, the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible. This will enable the Chief Veterinary Surgeon to

telegraph advice at once and state whether he is able to arrange for veterinary attendance on the case or not, and save valuable time, which is always of importance in acute cases.

6. The services of Government Veterinary Surgeons will only be available for private work with the consent of such officers, and when such work does not interfere with their official duties, or when the services of a private practitioner are not available.

7. As the arrangement of allowing Government Veterinary Surgeons to attend to private cases is intended purely for the benefit of farmers and stock-owners who may wish to obtain professional advice, no responsibility whatever will be accepted for any loss of stock, etc., which may result from the negligent treatment or advice, or wilful default, of any Government Veterinary Surgeon.

8. All fees collected in terms of these Regulations are payable to the Treasury through the local Receiver of Revenue.

Sale of Dip

With a view to enabling farmers to obtain dipping material at as low a rate as possible arrangements have been made whereby orders may be placed with any officer of the Veterinary Department for the purchase of supplies of Messrs. W. Cooper & Nephew's cattle dipping fluid, adapted for three-day, five-day or less frequent dipping. The price of the dip is 48s. 6d. per 10 gals., in not less quantities than that amount, delivered at any siding or station desired, in 5 gal. drums. Applications must be accompanied by remittances, without which they cannot receive attention. Remittances by cheque should be made in favour of Messrs. Meikle Bros., agents for the dipping fluid, commission being added, where necessary, to cover exchange. Coin or stamps will not be accepted. This dip is in use at all Government dipping tanks.

Sale of Virus

It is notified for public information that redwater and gall-sickness (*anaplasmosis*) virus may be obtained from the Veterinary Department, Salisbury, at a charge of ten shillings per dose.

Solutions of trypan blue and the injection used in the treatment of *trypanosomiasis* (fly disease) of cattle may also be obtained at a charge of five shillings per dose and blue tongue virus at one shilling and sixpence per dozen doses.

No material will be issued unless a remittance accompanies the order.

Irrigation

From the Agricultural Engineer assistance may be obtained by farmers for the following :—

1. In the locating of possible irrigation projects.
2. In the preparation of surveys or plans and for irrigation works, including weirs, dams, furrows, pumping plants, and determining the extent of land which may be brought under irrigation schemes, together with rough estimates of costs.
3. In the supervision of construction and carrying out of projects.
4. In the selection of suitable sites for boring operations.
5. Preparing specifications, etc., regarding pumping plants, windmills, and agricultural machinery.
6. Giving general advice on cognate subjects.

Informal advice of a general character will be given to applicants making enquiry by letter or in person. Any applicant desiring professional assistance likely to occupy more than one day should apply for advice in writing. All applicants should specify clearly the nature of the project on which they seek advice, and should give full particulars as to the distance and direction of their farms from some well-known centre. Applicants will be required to provide suitable means of transport for the officer concerned during the period devoted to work on the spot; to provide any unskilled labour that may be required; and to provide for any other contingent services. Applications should be addressed to the Director of Agriculture, who will endeavour to arrange visits as far as possible in order of application, but with due regard to situation, in order

to obviate unnecessary travelling and delay. The services of the Agricultural Engineer are given free, but in cases demanding prolonged individual attention, or repeated supervision, a charge may be made according to circumstances.

Samples

In connection with enquiries, especially with regard to diseases amongst crops, insect pests, soils, grain and the identification of plants, specimens should, wherever possible, be sent, together with full details. It is found that such parcels are often forwarded without any indication of where they are from or why they were sent and it is difficult in such cases to trace the sender. It is, therefore, requested that persons when forwarding samples for examination, indicate clearly their names and address on the package, so as to enable their requirements to be attended to without delay.

Charges for Dipping Cattle at Government Dipping Tanks.

On and after the 1st November, 1912, a charge of 1d. per head will be made in respect of all cattle dipped at Government dipping tanks.

Unweaned calves will be dipped free of charge.

Payment may be made in cash or by means of books of coupons at £1, 10/- and 2/6, which can be obtained from Civil Commissioners, Native Commissioners, or through all Veterinary Surgeons and Cattle Inspectors.

The tanks to which these provisions at present apply are the following :—

Salisbury (3), Bulawayo (3), Inyati, Umtali, Penhalonga, Melsetter, Marandellas, Macheke, Mazoe, Lomagundi, Hartley, Gwelo, Selukwe, Enkeldoorn, Victoria, Gwanda, Gatooma, Que Que, Umvuma, Kimberley Reefs.

Lectures for Farmers

The services of certain of the officers of the Department of Agriculture and the Veterinary Department are available for purposes of delivering lectures on subjects upon which they have special knowledge. As far as practicable, lectures will be accompanied by demonstrations at the time or subsequently in the field. Owing to the many calls on the time of the staff and the exigencies of their duties, alternative dates are desirable in order to avoid disappointment. The following topics are offered as examples of subjects that may be dealt with in this manner, but the suggestion of other themes is invited.

Agriculture.—Maize growing; Maize selection and maintenance of the breeding plot; Points of maize and maize judging, with demonstrations; Utilisation of granite vlei soils; Ground nut culture; Rotation crops for home use and for sale; Veld improvement by winter grasses; Production of foodstuffs for the mines; Ensilage; Fungoid diseases of maize and wheat; Wheat, oats and lucerne under irrigation; The prospects of cotton culture in Southern Rhodesia.

Veterinary Hygiene.—Detection and prevention of disease; The care of live stock.

Live Stock.—Judging of cattle according to breeds, and for beef, milk and draught; feeding and kraaling of live stock; general principles of cattle breeding; management of imported stock; grading up of native or local stock with pure bred bulls.

Dairying.—Home butter-making; building and equipment of a farm dairy; handling and marketing of milk; packing and marketing of butter; construction of cow houses.

Swine Husbandry.—Breeding and feeding of swine; some suggestions for the production of first-class bacon pigs; construction of piggeries at moderate cost.

Chemistry.—The principles of soil fertility; the principles of manuring; the value of lime in agriculture; chemistry of milk and its products (accompanied by demonstrations in milk-testing).

Entomology.—Economic entomology on the farm; the role of insects and their allies in the transmission of disease;

scale insects and fruit trees and methods for their control; insect pests and maize; enemies of the potato, insect and fungus; the value and objects of plant import and nursery regulations.

Irrigation.—Methods of applying water to land for irrigation; the measurement of water in connection with irrigation; canal irrigation; storage reservoirs; hints on the selection of sites and on the design of earthen and other dams; irrigation by pumping, with notes on the selection of plants.

Enquiries and invitations should in the first instance be addressed to the Director of Agriculture, Salisbury.

Departmental Bulletins

The following Bulletins, consisting of reprints of articles which have appeared in this Journal, are available for distribution free of charge to applicants in Rhodesia :—

AGRICULTURE.

- No. 2. The Possibilities of Rhodesia as a Citrus Growing Country, by R. McIlwaine, M.A., LL.B.
- No. 81. Possibilities of Export Trade in Oil Seeds, by H. Godfrey Mundy, F.L.S.
- No. 61. Requirements in sending Botanical Specimens to the Department for Identification.
- No. 71. Report of Forestry in Southern Rhodesia, by J. Sims, F.H.A.S.
- No. 78. Hints on Irrigation—Small Gravitation Schemes—Pipes and Pipe Laying—by W. Martin Watt, Government Agricultural Engineer.
- No. 68. Fertility of Soils and Organic Matter, by G. N. Blackshaw, B.Sc., F.C.S., Government Agricultural Chemist.
- No. 79. Winter Cereals, by H. Godfrey Mundy, F.L.S.
- No. 99. Bean Crops, by H. Godfrey Mundy, F.L.S.
- No. 125. Subterranean Water, by W. M. Watt.
- No. 137. Drainage for Irrigated and Swampy Land, by W. M. Watt.

CROPS.

- No. 55. How Maize can be made more profitable, by H. Godfrey Mundy, F.L.S.
- No. 115. Notes on Winter Cereals without Irrigation, by H. Godfrey Mundy, F.L.S., Government Agriculturist and Botanist.
- No. 76. Suggestions for Cotton Growers, by R. H. B. Dickson.
- No. 67. Maize Breeding and Seed Selection, by H. G. Mundy, F.L.S., Government Agriculturist and Botanist.
- No. 88. Chicory Growing, by H. Godfrey Mundy, F.L.S.
- No. 93. Soy Beans, by R. H. B. Dickson.
- No. 106. Cultivation and Preparation of Ginger.
- No. 107. The Cowpea, by R. H. B. Dickson.
- No. 126. Turkish Tobacco.
- No. 128. Paspalum, by J. A. T. Walters, B.A., Assistant Agriculturist and Botanist.
- No. 130. Notes on the Sowing of some Rhodesian Crops, by H. G. Mundy, F.L.S.
- No. 132. Sumatra Tobacco, Hints to Rhodesian Growers, by C. J. Sketchley.
- No. 133. Tobacco Culture (Virginia)—Planting, Cultivation, Fertilising, Priming, Topping, Suckering, Ripening.
- No. 136. Ensilage, by H. G. Mundy, F.L.S.
- No. 138. Tobacco Culture (Virginia)—Harvesting and Curing.

ENTOMOLOGY AND VEGETABLE PATHOLOGY.

- No. 58. Onion Thrips, by R. W. Jack, F.E.S.
- No. 12. The Tsetse Fly, by Ll. E. W. Bevan, M.R.C.V.S.
- No. 46. The Head Smut of Maize, by H. Godfrey Mundy, F.L.S.
- No. 89. Insect Friends of the Farmer, by R. W. Jack, F.E.S.
- No. 66. Selection of Spraying Outfit, by R. W. Jack, F.E.S.
- No. 69. Resin Wash and Means of Applying It, by R. W. Jack, F.E.S.
- No. 75. Fumigation of Fruit Trees with Hydrocyanic Acid Gas, by R. W. Jack, F.E.S.
- No. 100. Tsetse—Preliminary Notes on the Habits of—by R. W. Jack, F.E.S.
- No. 120. Some Insect Pests of Maize, by R. W. Jack, F.E.S.
- No. 139. Termites or "White Ants," by R. W. Jack, F.E.S.
- No. 140. Insect Pests of Tobacco in Southern Rhodesia, by R. W. Jack, F.E.S.
- No. 142. The Bean Stem Maggot, by R. W. Jack, F.E.S.

VETERINARY.

- No. 14. Bots in Equines, by R. Ferguson Stirling, M.R.C.V.S.
 - No. 54. African Coast Fever, by Ll. E. W. Bevan, M.R.C.V.S. (revised edition).
 - No. 51. Strangles, by F. D. Ferguson, M.R.C.V.S.
 - No. 113. Anaplasmoses of Cattle, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 114. Anaplasmosis of Sheep, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 117. Ephemeral Fever or Three Days' Sickness in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 118. Preparation of Blood Smears.
 - No. 121. Rabies, by Ll. E. W. Bevan, M.R.C.V.S., and T. G. Millington, M.R.C.V.S., D.V.H.
 - No. 49. Notes on Bovine Plasmoses of Southern Rhodesia, with special reference to Mashonaland, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 50. Epizootic Abortion in Cattle, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 103. Dipping and Tick-Destroying Agents, by Lt.-Col. H. Watkins-Pitchford.
 - No. 53. Animals Diseases Consolidation Ordinance, 1904.
 - No. 82. Difficult Parturition of the Cow, by C. R. Edmonds, M.R.C.V.S.
 - No. 91. Common Ailments of the Horse, by D. R. Chatterley, M.R.C.V.S.
 - No. 80. Detection and Prevention of Diseases of Stock, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 84. African Coast Fever—Diagnosis of Gland Puncture, by Ll. E. W. Bevan, M.R.C.V.S.
 - No. 95. Oestrus-ovis in Sheep, by Alec King.
- Conditions under which Government Veterinary Surgeons' Services are available to the public.

MISCELLANEOUS.

Terms for Analysis by the Department of Agriculture, of Produce, Soils, Water, etc.

- No. 108. Lime Deposits in Rhodesia and their Value, by G. N. Blackshaw, B.Sc., F.C.S.

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- No. 83. Hints on Brickmaking, by G. S. Dyke.
 No. 62. Services of Agricultural Engineer.
 No. 77. Animals Diseases Amending Ordinance, 1911.
 No. 90. Reports on Experiments—Experimental Station, Salisbury, 1910-1911, by J. H. Hampton.
 No. 10. Watering and Feeding of Live Stock on Railway.
 No. 93. Formation of Agricultural Credit Associations in Rhodesia, by Loudon M. Douglas, F.R.S.E.
 No. 96. Swine Breeds and Breeding of, by Loudon M. Douglas, F.R.S.E.
 No. 98. Pig Breeding and Feeding, by T. M. Rixon.
 No. 104. Stock Raising, by Otto Zimmerman.
 No. 105. Bacon Curing on the Farm, by Loudon M. Douglas, F.R.S.E.
 No. 110. Utility Poultry Keeping, for Amateurs and Beginners, by "Gallinule."
 No. 119. Some Notes on Charcoal Burning, by Eric A. Nobbs, Ph.D., B.Sc.
 No. 122. Notes on the Management of Dairy Herds, by R. C. Simmons.
 No. 123. Feeding and Care of Imported Bulls, by R. C. Simmons.
 No. 124. The Manuring of Maize on the Government Experiment Farm, Gwebi, 1912.
 No. 127. Notes on the Building of Farm Homesteads, by R. C. Simmons.
 No. 129. How to Make Use of the "Fencing Ordinance, 1904," by N. H. Chataway.
 Health and Clothing.
 Malaria: its History, Prevention and Cure, by A. M. Fleming, C.M.G., M.B., F.R.C.S. (Ed.), D.P.H. (Camb.), Medical Director.
 No. 131. Notes on Cattle Breeding, Part I. The Shorthorn, by R. C. Simmons.
 No. 134. Plans and Specifications for Flue Curing Tobacco Barns.
 Game Law: Summary of.
 No. 141. Dry Season and Droughts in Rhodesia, by Rev. E. Goetz, S.J.
 No. 143. Hints on Planting an Orange or Lemon Grove, by Chas. E. Farmer, Citrus Adviser to the British South Africa Company.
 No. 144. Rhodesian Tobacco—Prospects of an Australian Market, by Eric A. Nobbs, Ph.D., B.Sc.
 No. 145. Prospects for Importation of Cattle from Australia, by Eric A. Nobbs, Ph.D., B.Sc.
 No. 146. Notes on Cattle Breeding, Part II., by R. C. Simmons.
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HANDBOOK OF TOBACCO CULTURE for
Planters in Southern Rhodesia. Sold by the Depart-
 ment of Agriculture. 2/6.

Employment on Farms.

The Department of Agriculture receives numerous enquiries from persons of varied attainments, age and financial position for openings on farms, as managers, assistants and learners, requiring remuneration on corresponding scales, or willing to give services in return for keep.

In order that work may be found for the above and needs of farmers met, applications are invited from both employers and persons seeking employment. Applications are also invited from artisans, such as masons, bricklayers, carpenters, fencers, well sinkers, concrete workers, and the like who may desire work on farms. In cases where employers have obtained the labour they require, or applicants for employment have found work, it is requested that notification be at once sent to the Department of Agriculture, in order that unnecessary correspondence be avoided.

Replies to the following applications should be addressed to the initials of the advertisers, c/o Director of Agriculture, who will forward the letter to the party referred to.

SITUATIONS VACANT.

H. E. H.—Farm pupil. Board and lodging supplied.

W. M. W.—Partner with a little capital to develop farm situated in Figtree district. Terms to be mutually arranged.

C. E.—Stockman to take charge of cattle post. Salary £10 per month; milk supplied.

C. & E. K.—Vacancy for a man wishing to learn tobacco growing and general farming. Applicant will be required to invest a small amount of capital.

M. L. & S.—Young man capable of driving and taking charge of oxen. £3 a month and board and lodging. If suitable and signs on for one year, will be given 2 per cent. of mealie crop.

J. M.—Farm assistant, must talk native language and able to manage boys. £5 and board and lodging.

H. E. O. T.—Farm assistant for tobacco and general farming. Must have experience.

H. D.—Has opening for a young man, married preferred, with knowledge of dairy work. Must have had previous business experience. Good terms for a good man.

H. D.—Opening for a farm assistant. Must be able to drive oxen. Wages £12 10s. to start; no board.

SITUATIONS WANTED.

J. B.—Would like to work on shares. Seven years' experience of general farming in Cape Province.

H. S. D.—Graduate Hawkesbury Agricultural College, New South Wales. Served under Natal Government as orchardist and forester.

B. E.—As land surveyor or farm manager. Experience in latter in Norway. Graduated in agriculture at university in Norway.

C. H.—Twelve months' general farming experience in Rhodesia. Like to go in on share principle. Will work for board and lodging if chance given to learn tobacco growing.

N. P.—Experienced in general farming. Small salary, with board and lodging.

E. S.—To start with, prepared to work for board and lodging.

W. F. C. W.—Prepared to go on farm as pupil, and give services in return for board and lodging.

K. A. K. S.—Understands tobacco growing, and has knowledge of general farming. Has small capital, and prepared to go in on share principle.

G. A. M.—Nine years' experience at farming in Rhodesia. Thorough knowledge of buildings, tanks, etc.; would like management of a stud farm.

L. E. P.—Experience with stock on East Coast. Would like employment on tobacco and general farm.

M. A. M.—English and Canadian experience of general farming and stock. Prepared to manage an estate or dairy farm. Understands culture and curing of tobacco. Prefers to go in on share principle, but with small salary. Can invest a small amount of capital.

E. K. B.—Two years' training at the Colonial College of Agriculture in England, also two years' experience on a Canadian farm.

W. B.—Fifteen years' experience of stock and general farming in Australia. Thoroughly understands stud stock and sheep. Has had experience in Transvaal.

C. A. B.—Understands general and ostrich farming. Married; one child.

C. A. C.—Eighteen months' farming experience. Working knowledge of maize and general farming. Can handle cattle and sheep. Age 25.

G. G. H.—Thorough knowledge of tobacco growing and curing and general farming.

A. H.—Six months' experience of farming in Queensland. Prepared to work in return for board and lodging.

A. W. A. H.—Five years' Rhodesian farming experience. Ten years' farming and business experience in England. Will contract to work for 12 months.

R. W. K.—Age 18, brought up on farm, requires employment as farm assistant.

H. F. L.—Understands growing and curing tobacco.

W. F. L. L.—An English farm pupil, stock and general, for one year.

B. M.—As manager of tobacco farm.

B. O. M.—As manager of tobacco farm.

G. N.—Thorough experience in bacon curing, etc.

J. S.—Qualified Turkish tobacco grower and flue curer.

R. C. H. W.—Would like to get on a farm to gain experience.

H. L. W.—Thoroughly qualified in tobacco growing and curing, and management and training of oxen. Would like to work on shares.

R. C. M.—Thorough knowledge of tobacco growing and curing.

NOTICE

The Agricultural Journal of Southern Rhodesia

is issued by the Department of Agriculture, and can be obtained upon application to the Editor. The Annual Subscription, which must be paid in advance, is 5/-, and payment may be made by any means other than by stamps.

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Date,.....19.....

To the Editor,

"Rhodesia Agricultural Journal,"
Salisbury.

Please enrol me as a subscriber to the "Rhodesia
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19....., for which I enclose.....

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Please write distinctly.

Government Notices.

ANIMALS DISEASES AMENDING ORDINANCE, 1911.

Ordinance No. 2, 1911.]

[Promulgated 17th March, 1911.

BE IT ENACTED by the Administrator of Southern Rhodesia, with the advice and consent of the Legislative Council thereof, as follows:—

1. So much of the "Animals Diseases Consolidation Ordinance, 1904" (hereinafter referred to as the said Ordinance) and of any other law as may be repugnant to or inconsistent with the provisions of this Ordinance is hereby repealed.

2. The Administrator may, on the outbreak of a destructive disease, or when there is suspicion of the existence of such disease, declare an area around and including the place where such disease exists, or is supposed to exist, actively infected for the purpose of this Ordinance.

3. Whenever an area shall have been declared infected in terms of the last preceding section, the Administrator may, for the purpose of suppressing or controlling disease, cause such fences to be erected along the boundaries of or across any farms or land situated in such area as he may deem necessary.

4. (1) If the landowner shall not pay the cost of erecting any fence as aforesaid upon completion thereof, the cost shall be defrayed in the first instance out of moneys provided by the Legislative Council.

(2) When any fence erected as aforesaid runs along the boundary of a farm, the cost of the erection of such fence shall, if not sooner repaid, be repaid, together with interest at the rate of 5 per centum per annum, by equal yearly instalments commencing two years after the fencing is completed, such instalments being so calculated and fixed that the said cost and interest shall be wholly repaid within a period of fifteen years from the date when the first instalment became due.

(3) Such repayment shall be made by the adjoining landowners whose land has been divided by the fence. Each such landowner shall pay one-half the cost of the dividing fence and interest as aforesaid. When the adjoining land is a native reserve, or a portion of such reserve, the one-half of the cost shall be paid from funds in the local Treasury of the British South Africa Company.

(4) When any fence as aforesaid shall be erected within, and not on and along, the boundaries of any farm, the cost shall be paid from the funds of the local Treasury of the British South Africa Company, and the fence when no longer necessary for the purpose for which it was erected may be removed by the British South Africa Company; provided that the landowner shall have the right to purchase such internal fence at a price representing the total cost of such fence.

(5) The term "owner" shall mean (a) the person registered as such in the office of the Registrar of Deeds, (b) the British South Africa Company in respect of native reserves, and (c) the local authority in respect of municipalities.

5. Where the bed of a stream or river lies immediately between or constitutes the boundaries of land owned by private owners, the fence may be erected on one or other bank of the river or stream and across it, or partly

on one bank, across it, and partly on the other bank, in such manner as may be agreed upon by the owners whose lands are separated by the said stream or river. The Administrator may call upon the said owners to agree to the position of the said fence on or before a date fixed by him, and, should they fail to do so, he may cause such fence to be erected without further reference to the said owners. For the purposes of repayment, such fence shall be considered as dividing the lands of adjoining owners, and half the cost shall be recoverable from each owner whose lands are separated by the said stream or river.

6. The Administrator may call upon any owner whose land has been fenced in terms of section 3 or 12 to provide sufficient security for the payment of any sums that may be due to the British South Africa Company in its local Treasury in respect of such fence. If the owner shall fail or refuse to provide such security, the Administrator may cause a notice in writing to be sent to the Registrar of Deeds of the amount due by such owner, and the Registrar shall make an entry thereof in respect of the land fenced. Such entry shall constitute an hypothecation of the land, ranking from the date on which the entry was made and for the amount therein stated; provided that the Registrar may pass transfer of land so hypothecated, if the transferee agrees in writing that any sums due and unpaid shall remain and be registered as a charge against the said land.

7. When any land held under lease or permit of occupation has been fenced in terms of this Ordinance, during the term of such lease or permit the lessee or permit holder shall pay to the proprietor of such land yearly, during the continuance of the lease or permit of occupation, interest at the rate of £5 per centum upon so much of the cost of the fence as the proprietor is liable for, and such payment shall be made with the rent of the land, and shall be deemed in law to be part of such rent.

8. Any tenant or holder of land under a permit of occupation having a right to purchase such land at a fixed price shall, on completion of the purchase, pay to the proprietor, in augmentation and as part of the purchase money, any sum paid by such proprietor for the fencing of such land, and shall become and be liable to repay to the British South Africa Company in its local Treasury such sums as remain unpaid, as the same become due and payable in terms of this Ordinance.

9. Where in the case of any local authority the title to land provides that upon the sale thereof the British South Africa Company shall be entitled to receive a proportion of the purchase price, the local authority shall be entitled to deduct from the purchase price of land sold any debt due or amount paid by it in respect of fences on the land so sold erected under this Ordinance.

10. The provisions of sections 14 and 15 of the "Fencing Ordinance, 1904," in regard to repairs shall, *mutatis mutandis*, apply to fences erected in terms of this Ordinance.

11. Where a fence crosses any road used as of right by the public or by any neighbouring landowner, a properly constructed swing gate shall be placed at the point of crossing.

12. Any person opening such gate, except for the purpose of passing through, or omitting to close such gate after having passed through, and any person damaging such gate and omitting to immediately repair such damage shall be liable to a fine not exceeding £10, or in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

13. The Administrator may, for the purpose of the more effective prevention or control of disease, apply the provisions of this Ordinance in respect of fencing to municipalities and townships and such land adjoining as may be deemed expedient, and to places within a radius of ten miles of an area declared actively infected in terms of section 2 hereof, if, owing to the number of cattle in such places, or other causes, it appears expedient.

14. (1) The owner or proprietor of the land along the boundaries of which fences have already been erected by the British South Africa Company for the purpose of preventing the spread of

African Coast Fever in cattle shall be and is liable to repay to the British South Africa Company in its local Treasury one-half of the cost of so much of the fence as may be along the boundary of such land. The provisions of sections 7 and 8 of this Ordinance shall apply in the case of land held under lease or permit of occupation along the boundaries of which fences have already been erected. The British South Africa Company may remove any such fence already erected which is within and not on or along the boundaries of any land when no longer necessary for the purposes for which it was erected.

- (2) Any payment due in respect of any such fence may be made as provided by section 4 of this Ordinance, and under the like conditions as to security for such payment as are prescribed under section 6.

15. Within any area declared by the Administrator to be actively infected under the provisions of section 2, or to which the provisions of this Ordinance shall have been applied in terms of section 12, the Administrator may for the purpose of more effectively preventing the spread of disease cause to be constructed on any land a dipping tank and any structures incidental thereto or other appliances for the dipping of stock, and may recover the expenditure incurred from the owner of the land on which such tank, structures or appliances have been constructed. The cost of such tank, structures or appliances shall be paid on the same terms and under the same conditions as are applicable to boundary fences under sections 4, 6, 7 and 8 of this Ordinance.

16. In addition to any penalties that may be imposed under the said Ordinance or any amendment thereof, or under any regulations framed thereunder for the unlawful movement of cattle, the Court of the Magistrate before which the case is tried or the High Court in the like instance may direct the confiscation of any cattle unlawfully removed, and such cattle, if infected with disease or likely to convey infection, shall be destroyed without compensation. Should there be no danger of infection the Administrator may order such cattle to be temporarily kept at any spot denoted by him and then sold. The proceeds of any such sale shall be paid to the British South Africa Company in its local Treasury.

17. Section 11, sub-section (1) of the said Ordinance is hereby repealed, and in lieu thereof the following shall be the section:—

“Should any Inspector, Sub-Inspector or any person specially authorised by the Administrator to carry out the provisions of this Ordinance know or suspect that any animal is infected with any destructive disease such Inspector, Sub-Inspector or other authorised person may forthwith place such animal in quarantine, together with such land as is necessary for its isolation, and such animals as have been or are suspected of having been in contact with such animal or with infection. Notice of such quarantine shall be given in writing to the owner or custodian of such animal and to the Magistrate of the district, and shall remain in force for such time as the Chief Inspector or Controller of Stock may direct, unless the Administrator shall sooner, if he thinks fit, issue the notice referred to in sub-section (2) of section 5. A copy of the notice of any such quarantine shall be posted at the office of the Magistrate, and shall be inserted by the Magistrate in some newspaper, if any, circulating in the district.”

18. Section 16 of the said Ordinance is hereby repealed, and in lieu thereof the following shall be the section:—

“Any Government Veterinary Surgeon or any person thereto authorised by the Controller of Stock, Chief Inspector or by a Magistrate may enter any land, building, kraal or enclosure for the purpose of inspecting animals. Should any animal be found to be infected with any destructive disease, or should such infection be reasonably suspected, he may quarantine such animals as in this

Ordinance provided, and may order the proper disinfection of any building, kraal or enclosure in which such animal is or may recently have been, and the furniture and fittings thereof. Should it be impossible to properly disinfect such stable, kraal or enclosure, furniture or fittings in any of them, he may order the destruction thereof; provided that no building, kraal or enclosure shall be destroyed unless the owner consents thereto in writing, or failing such consent, the Administrator orders that such destruction be carried out."

19. Section 22, sub-section (1) of the said Ordinance is hereby amended by the addition of the following words after the word "obtained" in the twelfth line of the said sub-section, "and any person receiving or taking delivery of any animals without having ascertained that such permit has been obtained."

20. This Ordinance may be cited as the "Animals Diseases Amending Ordinance, 1911," and shall be read as one with the "Animals Diseases Consolidation Ordinance, 1904," and the "Animals Diseases Amendment Ordinance, 1910."

No. 216 of 1912.]

[4th July, 1912.

REMOVAL OF CATTLE TO PRESCRIBED AREAS.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that, notwithstanding the provisions of Government Notices Nos. 47 and 254 of 1910 and 51 of 1911 the removal of cattle to any point within twenty miles of the border of the territory defined by the Crocodile, Shashi and Ramaquabane Rivers, to the south-east beacon of Mphoeng's extension on the last named, may be allowed until further notice under permit from the Chief Inspector for the purposes of grazing and watering.

No. 50 of 1912.]

[8th February, 1912.

AFRICAN COAST FEVER.

Regulations regarding the movement of cattle and the prevention and suppression of disease.

1. UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notices Nos. 329 of 1910 and 308 of 1911 and make the following provisions in lieu thereof:—

2. The various districts of Southern Rhodesia are hereby declared an area infected with African Coast Fever for the purposes of section 5 (2) of the aforesaid Ordinance, and, save as hereinafter set out, all movement of cattle within the said districts is prohibited until further notice.

General Movement.

3. For the purpose of section 22 (1) of the said Ordinance, the following shall be regarded as places within the boundaries of which the movement of cattle may be allowed without special permission:—

- (a) Single farm.
- (b) Two or more adjoining farms, farmed together under one management and situated within one cattle transport area.
- (c) An area, the property of one owner, enclosed by a substantial fence.
- (d) For grazing purposes, an area within a radius of four miles of native kraals situated on unalienated land or in reserves, save and in so far as such area includes any private land.

The sites of such kraals shall be deemed to be the places where they are situated at the date of promulgation of these regulations.

4. Notwithstanding the provisions of the last preceding section, or of section 9 hereof, the Chief Inspector may, on the outbreak of disease, or for such other cause as may be deemed expedient, direct the isolation or quarantine of cattle on a limited area of the aforesaid places.

5. The movement of cattle from place to place may be permitted under the special permission, in writing, of an Inspector, Sub-Inspector, or other officer or person duly authorised by the Administrator to grant such permission.

6. No permission as aforesaid shall permit the movement of cattle—

- (a) Without the written consent of the owners, occupiers or managers of occupied land, and in the case of native reserves, of the Native Commissioner of the district over which land or reserve such cattle will pass, whether along roads or otherwise; provided, however, that refusal to grant such consent shall be in writing, and provided further that if the Controller of Stock or the Chief Inspector shall consider that such consent is withheld without good and sufficient cause he may permit of movement without such consent.

If any such person mentioned above refuse to give consent or to state a reason for refusing to do so in writing, no valid objection shall be deemed to exist and movement may be permitted without such written consent.

- (b) Within a veterinary district as defined in the Schedule annexed hereto from one transport area to or through another without the consent of the Cattle Inspector in charge of such area.
- (c) From any veterinary district to or through another without the consent of the District Veterinary Surgeon of such district.

Slaughter Cattle.

7. Cattle moved to any centre for slaughter under the provisions of these or any other regulations shall, on arrival, be immediately taken to such quarantine area (if any) as is provided for the purpose and immediately branded with the letters "V.D." on the near hip.

8. Cattle admitted to a quarantine area in terms of the last preceding section shall be slaughtered within twenty-one days of the date of admission, and shall not be permitted to leave the same except for the purpose of being slaughtered at the appointed abattoir, and if found outside such area, except for the said purpose, may be destroyed on the order of the Chief Inspector or Controller of Stock; provided, however, that the Chief Inspector may allow the removal of cattle from such an area under such conditions as he may prescribe.

Transport Cattle.

9. The use of cattle for draught purposes is prohibited except :—

- (1) Within the boundaries of the places defined in section 3 (a), (b) and (c) hereof.
- (2) Within the boundaries of areas already fixed for the use of cattle for draught purposes in terms of regulations published under Government Notice No. 329 of 1910, or such other areas as may be fixed by the Administrator.

10. Notwithstanding the provisions of section 9, no permit shall authorise the working of cattle

- (a) which are not clearly and distinctly branded with the registered brand of the owner;
- (b) in any wagon or vehicle which shall not have the owner's name and address legibly and permanently inscribed on the right side thereof.

11. No wagon or other vehicle drawn by oxen shall be moved from one cattle transport area into another without the permission of the Cattle Inspectors concerned, and under such conditions as they may impose.

General Provisions.

12. On the outbreak or suspected outbreak of disease, the Administrator may declare an area of infection around and embracing the place of outbreak or suspected outbreak, and a further area or areas around such area of infection as a guard area, whereupon all movement of cattle into and from place to place within such area or areas shall be immediately suspended, except as hereinafter provided.

A.—In areas of infection and guard areas:—

- (1) Cattle in transit by rail may be moved through such area.
- (2) Cattle from beyond the borders of Southern Rhodesia may be detained within such area or areas *en route* to destination.
- (3) Cattle for *bona fide* farming, dairy and slaughter purposes may be moved into such area or areas by permission of the Chief Inspector and under such conditions as he may impose.

B.—In guard areas only:—

Cattle may be moved into and from place to place within such area under the conditions of section 6 hereof.

13. The removal of green forage, hay, fodder, bedding reeds, manure or of such other articles as may be reasonably supposed capable of conveying infection, shall be prohibited from areas of infection, save and except with the special permission of the Administrator.

14. Whenever an area shall have been declared under section 12 hereof, every person within such area, or within such further area as may be specified by Government Notice, owning or in charge of cattle shall, upon the death or slaughter because of disease, suspected disease, or accident, of any such cattle, immediately report such occurrence through the nearest Cattle Inspector, Native Commissioner or Police Officer to the District Veterinary Surgeon.

15. Notwithstanding the provisions of these regulations, it shall be competent for the Chief Inspector of Cattle to authorise and direct the movement of cattle for the purposes of isolating, dipping, quarantine, or any other such objects as may be deemed necessary to prevent or suppress an outbreak of disease.

16. Whenever an area shall have been declared an area of infection or guard area in terms of section 12 hereof, any person who shall allow any cattle to stray or be otherwise removed, except as provided for in these regulations, from any one place within such area to another place, or from a place outside of to a place within such area, shall be guilty of an offence against these regulations.

17. All cattle within the limits of the various commonages and townlands, areas of infection and guard areas as declared under section 12 hereof, or depastured on common grazing ground, shall be dipped or sprayed at least once in every three days, unless the Chief Inspector shall authorise the extension of the time between such dipping or spraying, or the entire suspension of the same.

18. In all areas of infection and guard areas sheep and goats shall be dipped at such periods as may be directed by the Chief Inspector.

19. Whenever the owner, occupier, or manager of a farm shall adopt means of cleansing cattle running thereon, either by spraying, dipping, or by any other method, the Chief Inspector may order any natives or other persons having cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district within which the farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

20. All permits for the removal of cattle issued under the provisions of the said Ordinance or of any regulations framed thereunder shall specify legibly and clearly on the face thereof the place from and to which such cattle may be removed, the route by which they shall travel, the number and brands of such cattle, the time allowed for the journey, and such other particulars and conditions as it may be deemed expedient to provide.

21. No permit issued for the movement of cattle shall be taken to authorise any trespass in connection with such movement.

22. Notwithstanding the provisions of these regulations, it shall not be lawful for any owner of cattle to allow any such cattle to be on any road, public outspan, commonage, or any property other than that of the owner, unless they are free from ticks or unless they have been effectively cleansed by dipping, spraying or other process, within fourteen days of being allowed on such road or other place. Any beast having ten or more ticks on it shall not be considered free from ticks.

23. Any person contravening the provisions of these regulations or the conditions set out in permits issued thereunder, shall, where no higher penalty has been by the said Ordinance or any other law provided, be liable in respect of each offence to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months.

SCHEDULE "A."

VETERINARY DISTRICTS OF SOUTHERN RHODESIA.

(1) *Salisbury.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

32. Battlefields; 33. Hartley and Gatooma; 34. Gadzenia Station; 35. Makwiro Station; 36. Norton Siding; 37. Hunyani Tank; 38. 1645½ Peg B. & M. & R. Railways; 39. Salisbury A.; 40. Salisbury B.; 41. Salisbury C.; 42. Salisbury D.; 43. Arcturus; 44. Bromley; 45. Marandellas North; 46. Marandellas South; 48. Headlands Station; 49. Junction Mazoe and Lomagundi Railways; 50. 23-Mile Peg, Lomagundi Railway; 51. Passaford Station; 52. 35-Mile Peg, Lomagundi Railway; 53. Gwibi Tank Halt; 54. Banket, Lomagundi; 55. Eldorado, Lomagundi; 56. Selby Siding; 57. Mazoe; and 58. Kimberley Reefs.

(2) *Bulawayo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

1. Plumtree; 2. Marula Siding; 3. Figtree; 4. Westacre Junction; 5. Bulawayo Area; 6. Heaney Junction; 7. Bambesi Station; 8. Insiza North; 9. Insiza South; 10. Shangani North; 11. Shangani South; 14. Redbank; 15. Nyamandhlovu Station; 16. Malindi Station; 17. Wankies Area; 18. Matetsi Siding; 19. Matopo Terminus; 20. Sabiwa Siding; 21. Gwanda Station; 22. West Nicholson; 23. Belingwe; 59. Essexvale and Balla Balla Areas; 60. Stanmore Siding Area; 61. Filabusi Area.

(3) *Gwelo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912 :—

12. Somabula Siding; 13. Gwelo Station; 24. Selukwe Area; 25. Surprise Area; 26. Indiva Siding; 27. Lalapanzi; 28. Iron Mine Hill Siding; 29. Umvuma Siding; 31. Que Que Station.

(4) *Umtali.*

An area comprising the native districts of Umtali, Melsetter, Makoni and Inyanga.

No. 189 of 1912.]

[6th June, 1912.

REMOVAL OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that, notwithstanding the provisions of section 12 of Government Notice No. 50 of 1912, the removal of cattle for purpose of obtaining food or water may be permitted at the discretion of the Chief Inspector, and under such conditions as he may prescribe.

No. 175 of 1912.]

[30th May, 1912.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that, notwithstanding the provisions of Government Notices Nos. 47 and 254 of 1910 (and 51 of 1911), the removal of cattle to within that portion of the prescribed areas westward of the Salt River, Tuli district, may be allowed under permit from the Chief Inspector, for the purposes of grazing and watering.

No. 233 of 1912.]

[11th July, 1912.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notice No. 127 of 1910, in so far as it relates to the Protectorate of Nyasaland, and further do hereby prohibit the introduction into Southern Rhodesia of cattle from Nyasaland until further notice.

No. 252 of 1912.]

[1st August, 1912.

AFRICAN COAST FEVER. TRANSPORT AREAS.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 9 of the regulations published under Government Notice No. 50 of 1912, declare the areas described in the subjoined Schedule as areas within which the use of cattle for draught purposes may be permitted.

SCHEDULE.

62. *Mazi Siding.*

An area including the farms Cheronga, Highfield, Kirbyvale, Mona, Dyffryn, Maidstone, Harrisonville, Recondite and Crofton.

63. *Inyazura Siding.*

An area bounded by and including the following farms:—Inyamapamberi Outspan, Tiny, Marngu, Mount Zonga Commonage, Mount Zonga, Kwapassi Outspan, Orowati, Tableview, Tsungwesi Source, Tsungwesi Ridge, Everton, and the unsurveyed land lying east of a line drawn from the north-west beacon of Everton to the south-west beacon of Tiny.

64. *Igusi Siding.*

An area bounded by and including the following:—Winter, Spring, Eland, Buda Block No. 2, Grant, Batley, Groote Schuur No. 2, Frankland, Fry's Farm, Goshen Flat, Uhlanulu, Ubusiga, Ughwindhla, Ihlobo, Woodlands, Teakdale, Barn Park, Forest Hill, Groote Schuur, Majindan, Mvuba, Barwon, Campaspe, Esperanza, Merryland and Maraposa.

65. *Gwaai Area.*

An area bounded by the Malinda area, the Bechuanaland border, the Plumtree, Nyamandhlovu, Igusi Siding, Bembesi, Shangani North and Gwelo areas, from the most northerly point of the latter down the Shangani River to the western boundary of the Shangani Reserve, thence in a southerly direction along the same to the Gwampa River and down this river to the Malinda area.

No. 82 of 1913.]

[13th March, 1913.

AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notices Nos. 338 of 1912 and 13 of 1913, and, in terms of section 12 of Government Notice No. 50 of 1912, declare the following areas of infection and guard areas for the purposes of the said Ordinance:—

(1) NATIVE DISTRICTS OF UMZINGWANE, BULAWAYO, MATOBO AND BULI.

(a) *Areas of Infection.*

The farms Alnwick, Nyorka, Induba, Collaton, Irene, Maboqutwaneni Outspan, the portion of the Essexvale Estate known as the North Paddock, which adjoins the farm Ballarat on its eastern boundary, and the fenced subdivision of Bulawayo Commonage, which includes the township, suburbs and Hillside.

(b) *Guard Area.*

An area bounded by and including the following farms: Lochard Block, Half Ration Ranche, Chilton, Fincham's, Inyati Reserve, Huntsman, Robert Block, Induna, Waterfall, Dingaan, Rouxdale, Fundisi, Helenvale (excluding farms Nos. 1, 3 and 16), Sights, Bilars, Stonycroft, Craiglee, Blewbony, Ireland, Welcome, Springvale, Vriegezicht, Paul's Rest, McGeer's Luck, Centenary Mission, Outspan No. 3, Anglesea, Mineral King, World's View, Matopo Block, Mission Farm, Brethren in Christ, Absent, that portion of the Matopos lying north of a line drawn from the south-eastern beacon of Absent to the north-western beacon of Longfield, The Range, Clarke's, Swaithe's, Limerick, Pioneer's Rest, Hayhill, Reitfontein, Bradford, Hamilton, Mayfair, York, Induna, Rathline, Westondale, Sub-division A, Fochabers, Kodhwayo, Zimbili and Lochard Outspan.

(2) NATIVE DISTRICT OF SALISBURY.

(a) *Areas of Infection.*

Salisbury Commonage, the southern portion of the farm The Grange.

(b) *Guard Area.*

The farms Reitfontein, the northern portion of The Grange, Gletwyn, Sternblick, Chikurubi, Greendale and Nursery.

(3) NATIVE DISTRICT OF UMTALI.

(a) *Area of Infection.*

Umtali Commonage.

(b) *Guard Area.*

The farms Devonshire, Quagga's Hoek, Fern Valley and Fern Hill.

No. 122 of 1913.]

[24th April, 1913.

AFRICAN COAST FEVER.

I DO hereby, in terms of section 12 of the regulations published under Government Notice No. 50 of 1912, declare the following area of infection and guard area for the purposes of the said regulations:—

(a) *Area of Infection.*

Hatfield Estate and Hatfield Estate Plots, in the native district of Salisbury.

(b) *Guard Area.*

The following farms in the native district of Salisbury:—Makabusi Outspan, Hopley, Saturday Retreat, Odar Outspan, Stoneridge, Eyrecourt, Boutelle, Twentydales, Glenwood, Adelaide, Ventersburg, Makabusi, Gallagher's, M.T.C., Prospect, Ardbennie Township, Waterfall, Spreckley, Retreat, Eyerston, Bunkershill, Adair, Epworth and Godavery.

No. 123 of 1913.]

[24th April, 1913.]

AFRICAN COAST FEVER.

WHEREAS there has been an outbreak of a destructive disease, to wit, African Coast Fever, on the Hatfield Estate Plots, I, under and by virtue of the powers vested in me by the "Animals Diseases Amending Ordinance, 1911," do hereby declare the following area in the native district of Salisbury to be an area actively infected with African Coast Fever for the purposes of the said Ordinance:—

An area bounded by and including the following farms:—Makabusi Outspan, Hopley, Saturday Retreat, Odar Outspan, Stoneridge, Eyrecourt, Boutelle, Twentydales, Glenwood, Adelaide, Ventersburg, Makabusi, Gallagher's, M.T.C., Hatfield Estate, Hatfield Estate Plots, Prospect and Ardbennie Township.

No. 129 of 1913.]

[1st May, 1913.]

AFRICAN COAST FEVER.

I DO hereby, in terms of section 12 of the regulations published under Government Notice No. 50 of 1912, declare the following area of infection and guard areas in lieu of the areas published under section (1) of Government Notice No. 82 of 1913:—

(1) THE NATIVE DISTRICTS OF BULAWAYO, MATOBO, BULALIMA-MANGWE AND BUBI.

Area of Infection.

The farms Collaton, Irene, Mabogutwaneni Outspan, and within a radius of four miles of Inyamba's Kraal on Alnwick Estate.

Guard Areas.

(a) An area bounded by and including the following farms:—Alnwick Estate, Joe's Luck, Honeybird Kop, Doublevale, Maritzburg, Springvale, Outspan No. 3 Tati Road, Vregevecht, La Concorde, Lucydale, Lonsdale, and the fenced north-western section of Westacre Creek.

(b) The fenced sub-division of Bulawayo Commonage which includes the township, suburbs and Hillside.

(c) The farm Induba.

No. 143 of 1913.]

[15th May, 1913.]

AFRICAN COAST FEVER.

I DO hereby, in terms of section 12 of the regulations published under Government Notice No. 50 of 1912, declare the following area of infection and guard area for the purposes of the said regulations:—

(a) *Area of Infection.*

The farms Inodzi, Nyagari, Mountain Home (The B.), Umtali Mission and the Penhalonga Valley.

(b) *Guard Area.*

That portion of the native district of Umtali bounded on the south by a line running from the Odzi River along the south-western boundaries of the farms Odzi Junction, Grange, and Premier Estate, and the northern boundaries of the farms Devonshire, Wiermouth and Umtali Commonage to the Anglo-Portuguese boundary.

No. 145 of 1913.]

[15th May, 1913.

FEEES FOR DIPPING CATTLE AT GOVERNMENT DIPPING
TANKS.

UNDER and by virtue of the powers vested in me by section 5, sub-section 6 (e), of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that a charge of one penny per head will be made in respect of all cattle dipped at Government dipping tanks. Unweaned calves will be dipped free of charge.

No. 342 of 1912.]

[24th October, 1912.

TRANSPORT AREAS.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 9 of the Regulations published under Government Notice No. 50 of 1912, declare that, until further notice, the main road between the Tokwe and Ngesi Rivers is included in Area No. 24, Government Notice No. 11 of 1912, and the use of cattle for draught purposes is therefore permitted up to the Ngesi River upon the said road.

No. 392 of 1912.]

[19th December, 1912.

TRANSPORT AREAS.

WHEREAS it is desirable to afford facilities for a limited amount of transport with cattle from Shangani Station to the Native Commissioner's Office in the Belingwe district, I, under and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," do hereby, notwithstanding any regulations to the contrary, authorise the Chief Inspector to permit of such transport under such terms and conditions in writing as to him may seem fit.

No. 22 of 1913.]

[16th January, 1913.

MOVEMENT OF CATTLE.

IT is hereby notified for general information that, in terms of section 5 of the regulations published under Government Notice No. 50 of 1912, I do hereby authorise Native Commissioners and Assistant Native Commissioners to issue permits for the movement of cattle from place to place, in conformity with the provisions of the said regulations.

No. 147 of 1913.]

[22nd May, 1913.

MOVEMENT OF CATTLE.

WHEREAS it is necessary to afford facilities for transport with cattle between the Gadzema Station; Banket, Lomagundi; and Eldorado, Lomagundi; areas as described in the schedule to Government Notice No. 11 of 1912, I, under and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," notwithstanding any regulations to the contrary, declare that the above-mentioned areas shall be regarded as one for the purposes of working draught cattle for a period of three months from date hereof.

No. 110 of 1908.]

[16th April, 1908.

IMPORTATION OF CATTLE.

UNDER and by virtue of the powers conferred on me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and repeal so much of the Regulations published under Government Notice No. 187, dated the 26th of July, 1906, as relate to the importation of cattle from the Colony of the Cape of Good Hope and the United Kingdom of Great Britain and Ireland, and make the following provisions in lieu thereof:—

1. The importation of cattle may be permitted from the Colony of the Cape of Good Hope and the Orange River Colony on the following terms and conditions—

- (1) A permit shall be required from the Chief Inspector which may contain such conditions as shall from time to time appear expedient.
- (2) Applications for permission to import shall be in the Form "A" attached hereto, and accompanied by a declaration in the annexed Form "B"
- (3) The importation of cattle with more than two permanent central incisor teeth shall not be permitted.
- (4) All importations shall be by rail and for the purposes thereof Bulawayo shall be regarded as the port of entry.
- (5) All cattle imported in terms of these Regulations shall on arrival at Bulawayo, Salisbury, or Umtali be removed to a place of quarantine under the supervision of an Inspector of Cattle, there to be submitted to such examination and tests as the Chief Inspector may direct. If such examination or tests disclose the existence of any destructive disease the cattle shall be immediately destroyed and the carcasses thereof disposed of in such manner as a Government Veterinary Surgeon may authorise or require. The Chief Inspector may permit of any examination or tests as aforesaid being dispensed with in the case of cattle in transit by rail for any place beyond the boundaries of Southern Rhodesia.
- (6) All expenses or losses incident to quarantine, examination, testing or destruction as aforesaid shall be borne by the owner of the cattle.

2. The importation of cattle from the United Kingdom of Great Britain and Ireland may be permitted under the following terms and conditions—

- (1) Importation shall be through and direct from the coast ports of the Cape Colony, and there shall be a consignment note or other satisfactory evidence that cattle so imported have come direct from Great Britain or Ireland.
- (2) The provisions of sub-sections (5) and (6) of section 1 hereof shall apply to importations in terms of this section.

3. No person shall import cattle in terms of these Regulations except for his own use, provided however that permission may be granted to import for others on the applicant disclosing the name of the person or persons for whom he proposes to act.

4. Any person introducing cattle in contravention of these Regulations, or failing to comply with any conditions attached to permits to import, or furnishing applications, declarations, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, testing, destruction or disposal of carcasses, shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of

payment to imprisonment with or without hard labour for any period not exceeding six months, unless higher or greater penalties shall have been provided for such offences by the "Animals Diseases Consolidation Ordinance, 1904," provided however that the penalties imposed by these Regulations shall not exempt any cattle from destruction in terms of the aforesaid Ordinance.

ANNEXURE "A."

APPLICATION FOR CATTLE IMPORTATION PERMIT.

1. Applicant's Name and Address.....
2. Number and Class of Cattle to be imported.....
3. Area or Farm and District where Cattle are at present located.....
4. Area or Farm and District to which Cattle are to be moved.....

Applicant's Signature.....

Date.....

Application.....

Permit No.....

ANNEXURE "B."

I,
 residing on the farm
 in do solemnly and sincerely
 declare that the (number in
 writing) animals also enumerated below have been in my possession since
 birth, and that lung sickness, pleuro-pneumonia or other contagious or
 infectious disease has not existed amongst any of my cattle, nor on my
 farm, nor among any cattle with which these animals have been in contact
 within the last four years, and that these animals have never been exposed
 for sale in any public market or stock fair, nor been in contact with strange
 cattle, and that to the best of my knowledge and belief such cattle in
 travelling to.....Station (i.e., station where cattle
 are to be trucked) will not come into contact with any animals amongst
 which lung sickness or any other contagious or infectious disease has existed
 during that period.

Number of Animals Bulls Heifers

Breed

Seller's Name and Address

Purchaser's Name

Place in Southern Rhodesia to which animals are being sent

And I make this solemn declaration conscientiously believing the same to
 be true.

Declared to at on this
 day of before me,

Resident Magistrate for the district of

No. 60 of 1913.]

[13th February, 1913.

IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby authorise the importation from the Kingdom of the Netherlands of cattle required for *bona fide* breeding purposes; provided, however, that such importation shall *mutatis mutandis* be subject to the provisions of Government Notice No. 110 of the 16th April, 1908, relating to the importation of cattle from the United Kingdom of Great Britain and Ireland.

No. 47 of 1913.]

[6th February, 1913.

IMPORTATION OF SHEEP, GOATS AND PIGS.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that the introduction of sheep, goats and pigs against which no prohibition exists may be permitted from overseas, *via* the port of Beira, under the following conditions:—

- (1) Umtali shall be the port of entry;
- (2) that all such importations shall be in accordance with the regulations now in force or as amended from time to time;
- (3) that all animals shall be transferred directly after disembarkment to the railway trucks at Beira and conveyed thence to Umtali without leaving the said trucks.

REGULATIONS UNDER WHICH STOCK IS ALLOWED TO PASS IN TRANSIT THROUGH THE TERRITORY OF THE MOZAMBIQUE COMPANY.

WITH reference to Government Notice No. 47 of 1913, the conditions under which stock is allowed to pass in transit through the territory of the Mozambique Company are published below for public information:—

(By "stock" is meant: horses, cattle, mules, donkeys, sheep, goats, pigs and dogs.)

I. The Customs official shall not allow disembarkation of any kind of stock at the port of Beira, when the said stock is in transit to Rhodesia, before a written permission from the Veterinary Department stating therein that disembarkation can take place.

II. In order to obtain this permit, mentioned in the foregoing article, the owner or his representative, who may be his Custom house broker, must have a written application for such permit, to the Chief Veterinary Surgeon of the Companhia de Mocambique, giving at the same time the following particulars, in writing:—

- (a) the number of heads of stock to be landed;
- (b) kind of stock;
- (c) what country the stock comes from, giving the name of the region;
- (d) the destination of such stock.

III. The importer, or his representative, must present at the same time the following certificates:—

- (a) one certificate from a Veterinary Surgeon of the country of origin of the said stock, stating that the region is free from any epizootic disease and that all the animals are also free from any such diseases;

- (b) a certificate signed by the captain of the ship which brought the stock, stating the number of deaths, if any, which have occurred during the voyage and if possible the cause of death.

IV. Having received the above-mentioned certificates and the information required by the foregoing articles, one of the Veterinary Surgeons of the Companhia de Mocambique, or their substitute, will proceed to inspect the stock on board the ship.

V. If during the inspection the Veterinary Inspector suspects the presence of any contagious disease, he will with the least possible delay investigate the case, and if his suspicions are confirmed and he has reason to believe that the disease in question might spread within the Territory of the Companhia de Mocambique, he shall refuse to issue the permit referred to in Article I. of this order.

VI. If after the inspection the Veterinary Surgeon or his substitute is satisfied that there is no danger in allowing such stock to pass through the Territory in transit, he shall issue the permit referred to in Article I. of this order.

VII. The Chief of the Customs Department, having received the permit referred to in Article I., shall allow disembarkation of the said stock under the following conditions:—

- (a) the only means by which any stock can be taken through the Territory is by rail;
- (b) that the stock should be taken directly after the disembarkation from the lighters to the railway station and placed in wagons or trucks. The windows and other openings for ventilation in the wagons should be covered up with wire netting, the meshes of which are small enough to prevent the entrance of biting flies, etc.;
- (c) having once been entrained, the animals will not be allowed to leave those wagons or trucks whilst they are in the Territory of the Companhia de Mocambique;
- (d) that any forage or hay that may be landed for the use of the stock to which this order refers, if not utilised for the purpose, will be burnt if between the time of disembarkation and the departure of the stock by train it has not been consumed, despatched or re-exported.

Any contravention of this order shall be considered a transgression, and as such be dealt with according to No. 3 of Article 74 of the Customs Regulations in force.

The authorities and every one whom it may concern to abide by and obey.

No. 211 of 1910.]

[4th August, 1910.

IMPORTATION OF CATTLE FROM NORTH-WESTERN RHODESIA.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that, notwithstanding the prohibition contained in Government Notice No. 89 of 1908, the importation of cattle from North-Western Rhodesia may be permitted under the following terms and conditions:—

1. The permission of the Chief Inspector of Cattle shall be first had and obtained.

2. All cattle shall be introduced (a) by rail via the Victoria Falls, or (b) by way of the town or port of Feira, which are hereby declared to be ports of entry.

3. All applications for permission to import shall be accompanied by a certificate by a Government Veterinary Surgeon of North-Western Rhodesia that—

- (a) the districts from which they come and through which they pass are free from contagious diseases of animals;
- (b) the animals in respect of which the application is being made have been examined and are free from contagious diseases of animals.

4. All cattle shall on entry be taken, where possible by rail, to such quarantine area and shall remain in quarantine for such period as the Chief Inspector of Cattle shall direct, but not less than three months.

5. Any person found introducing cattle in contravention of these regulations, or failing to comply with any of the conditions attached to permits to import, or furnishing applications, certificates, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, etc., shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months; provided, however, that the penalties imposed by these regulations shall not exempt from liability to penalties, forfeiture, or destruction, elsewhere provided for

ANNEXURE "A."

Certificates under Section 3.

(a) I hereby certify that I have examined the following cattle belonging to Mr.

.....cows and heifers,
calves,
oxen and bulls,

and that the districts from which they come and through which they will pass in this Territory *en route* to Southern Rhodesia are to the best of my knowledge free from all destructive diseases of cattle.

Signed.....
 Government Veterinary Surgeon.

(b) I hereby certify that I have examined the following animals belonging to Mr.

.....cows and heifers,
calves,
oxen and bulls.

In my opinion these animals are free from all destructive diseases.

Signed.....
 Government Veterinary Surgeon.

NOTE.—All numbers are to be expressed in words.

No. 375 of 1912.]

[28th November, 1912.]

IMPORTATION OF POULTRY.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended by the "Animals Diseases Amendment Ordinance, 1910," I do hereby declare and make known that the following regulations shall be in force and effect from date of publication hereof :—

(1) All poultry imported by rail shall be inspected by an Inspector or Sub-Inspector at Plumtree, Bulawayo or Umtali.

(2) Should any consignment of poultry shew symptoms of disease, or should such Inspector or Sub-Inspector have reason to believe that any disease exists in, or that infection is likely to be conveyed by such consignment, he may order the detention and isolation of the whole consignment for such period as he may deem necessary.

(3) The Chief Inspector may order the destruction of all poultry which he has reasonable grounds for believing to be diseased or likely to convey infection.

No. 391 of 1908.]

[17th December, 1908.]

BRANDS ORDINANCE AMENDMENT ORDINANCE, 1908.

UNDER and by virtue of the powers vested in me by the "Brands Ordinance, 1900," as amended by the "Brands Ordinance Amendment Ordinance, 1908," I do hereby cancel and withdraw the Regulations published under Government Notice No. 204 of 1900, and declare the following shall be in force in lieu thereof, from and after the 7th January, 1909 :—

1. The Registrar of Brands shall have his office in the Agricultural Department. With the exception of the Magistrate of Salisbury, the Magistrate in each district of Southern Rhodesia, and the Assistant Magistrate in each sub-district, shall be a deputy Registrar of Brands for the magisterial district or sub-district to which he is appointed. The offices of the Deputy Registrars of Brands shall be the offices of the several Magistrates.

2. (a) The form of application for registration of a brand shall be that marked "A" in the Schedule attached to this Notice.

(b) The form of a certificate of registration shall be that marked "B" in the said Schedule.

(c) The form of a transfer of a brand from one registered proprietor to another shall be that marked "C" in the said Schedule.

(d) The form of a certificate of such transfer shall be that marked "D" in the said Schedule.

3. Each Deputy Registrar of Brands shall keep a register, in the form of Schedule "E" hereto, of all brands allotted within his district under the provisions of the Ordinance.

4. Save as hereinafter provided, every registered brand shall consist of two letters and a numeral of plain and uniform pattern; and the first of the letters shall indicate the magisterial district or sub-district in which the holding is situate on which the brand is to be used, and shall be placed above the numeral and letter comprising the brand, so as to be in triangular form.

5. One brand and no more shall be allotted to any person in one magisterial district or sub-district.

6. The size of the characters branded on stock shall not be more than three inches in height nor more than two inches in width.

7. An applicant for a brand shall be allotted the next vacant brand assigned to the district in which he is located, as set forth in Schedule "F" hereof.

8. Each Deputy Registrar shall keep a list of brands assigned to his district, for the inspection of applicants for brands.

9. There shall be payable to the Registrar or Deputy Registrar—

(a) For every separate registration of a brand, 5s.

(b) For every transfer of a brand, 5s.

10. All brands shall be imprinted on stock as follows :—

(a) In the case of horses, mules or donkeys, the first brand shall be imprinted either on the near side of the neck or near rump, and any second or subsequent brand shall (where there is sufficient space for such purpose) be imprinted on the same part of such animal, and at a distance of not less than one and a half inches from and directly underneath last imprint, according to the table herein set forth.

Where there is not sufficient space for the purpose, then such second or subsequent brand shall be imprinted on the part of such animal next in order, according to the following table :—

i. Off Neck or Rump (or Thigh);

ii. Near Shoulder (or Top of Arm);

iii. Off Shoulder (or Top of Arm).

(b) In the case of cattle, the first brand shall be imprinted on the near rump or thigh of the animal, and every second or subsequent brand shall be imprinted at a distance of not less than one and a half inches from and directly underneath the brand last imprinted, according to the following table :—

i. Off Rump (or Thigh);

ii. Near Shoulder (or Top of Arm);

iii. Off Shoulder (or Top of Arm).

(c) In the case of sheep and goats, the first brand shall be imprinted on the near shoulder, and all second or subsequent brands in the following order :—

i. On Near Side or Ribs;

ii. Near Rump (or Thigh);

iii. Off Shoulder;

iv. Off Side or Ribs;

v. Off Rump (or Thigh).

(d) In the case of ostriches :—

i. On Near Thigh;

ii. On Off Thigh.

11. Each proprietor of a registered brand shall have the right, in addition to imprinting his brand in the manner above prescribed, to place such brand on the ears of such animals by punching, tattooing or ear-rivets.

12. The owner of any brand may surrender the same, and the Registrar shall, on receipt of notice thereof, cancel the registration by notice in the *Gazette*.

13. When it appears to the Registrar, upon the report of a Deputy Registrar, Native Commissioner, or Cattle Inspector, that a registered brand is not in use, he may cause notice thereof to be given to the owner thereof, calling upon him to shew cause why the same should not be cancelled; if cause is not shewn to the satisfaction of the Registrar within six months after such notice, he may cancel the brand.

14. No brand which has been surrendered or cancelled shall be re-allotted until a period of five years from such surrender or cancellation has elapsed.

15. The Registrar shall, at the end of each quarter in every year, or as soon thereafter as possible, transmit for publication in the *Gazette* a statement, in the form of Schedule "E" hereto, of all brands registered under the Ordinance up to the last day of such quarter.

16. The Registrar shall allot a brand to every public pound already or hereafter to be established, and shall register the same.

The first character of every such brand shall be a diamond, and the second the dominant letter of the magisterial district or sub-district, and the third a numeral, the dominant letter to be placed above the diamond and numeral, so as to form a triangle; and the Poundmaster shall, on sale of any stock impounded therein, brand the same with such brand on the portions and in the order prescribed in these Regulations, to shew that the said brand is the last brand at that time imprinted on such stock; and any Poundmaster who shall fail to comply with the provisions of this section shall on conviction be liable to a fine not exceeding £5.

No. 396 of 1912.]

[26th December, 1912.

RABIES.

UNDER and by virtue of the powers vested in me by section 59 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare all the districts of Southern Rhodesia to be an area coming under the operation of Part VI. of the said Ordinance, and I do further hereby publish the sub-joined regulations for preventing the spread of the disease known as rabies:

1. The regulations published under Government Notice No. 45 of 1909, as amended by Government Notices Nos. 284 of 1911 and 260 of 1912, are hereby repealed, but nothing herein contained shall affect the validity of current notices issued by the Administrator in terms of the said regulations.

2. Any Magistrate, Police Officer, Native Commissioner, Government Veterinary Surgeon, or other official vested with the performance of functions under the "Animals Diseases Consolidation Ordinance, 1904," may on its appearing to him that any dog or other animal is shewing symptoms which justify investigation as to whether such dog or animal is suffering from rabies or not, order the proper detention, isolation and control of such dog or animal, either in the hands of the owner or at some other suitable place.

3. Should any dog shew symptoms which lead to the suspicion that such dog may be suffering from rabies, the owner thereof shall forthwith notify the fact to the nearest official vested with powers under these regulations, who shall immediately report the same to the Chief Veterinary Surgeon, and shall either destroy the said dog or isolate and secure it for further observations.

4. On its appearing that any animal is actually suffering from rabies, any of the above-mentioned officials may order the destruction of such animal, or may himself destroy it, and may further take control of or destroy, if deemed necessary, any animal which has been in contact with a rabid animal or an animal suspected of being rabid.

5. The carcasses of all animals destroyed on account of their being infected with rabies shall be thoroughly burnt by the person or official destroying them, save that such parts as may be required for scientific investigation may be retained under proper precautions. In any case in which a human being has been bitten by a rabid animal, the head of such animal shall, if possible, be taken and sent to the nearest veterinary official.

6. (1) In the event of an outbreak of rabies occurring, the Administrator may, by notice in the *Gazette*, direct that all dogs within a radius of fifteen miles of such outbreak, or such other area as may be fixed, shall be kept in a safe enclosure or chained up for a period of not less than six weeks from such notification, or such other period as may be fixed, but may be taken out for exercise if kept on a chain or leash by the person exercising them.

(2) In the event of a suspected outbreak of rabies occurring, the Magistrate of the district may, and at the request of the Chief Inspector of Stock shall, direct that all dogs within a radius of fifteen miles, or such other area as may be deemed necessary, shall be kept in a safe enclosure or chained up for a period not exceeding four weeks, but may be taken out for exercise if kept on a leash or chain by the person exercising them.

(3) No dog shall be removed from any proclaimed area during such period of quarantine.

7. Notwithstanding the provisions of section 6 (1) and (2), packs of foxhounds, harriers, or beagles, duly registered as such before the Magistrate of the district in which their owner or owners reside, may be used for the purposes of the chase when under the ordinary supervision and control of not less than two persons engaged in the chase.

8. Any person contravening any of the above regulations, or failing to carry out any of the provisions thereof, shall be liable, on conviction, to a fine not exceeding £10 for each offence; or, in default of payment, to imprisonment with or without hard labour for a period not exceeding one month.

9. These regulations shall come into operation on the 1st day of January, 1913.

No. 336 of 1911.]

[26th October, 1911.

RABIES.

THE following instructions regarding the treatment of persons bitten by rabid animals are published for general information.

In every case where a person has been bitten by a dog or other animal known or suspected to be rabid, the following precautions are recommended:—

- (1) The wound should be immediately and thoroughly cauterised. This, if it does not altogether prevent the disease, delays its onset sufficiently for Pasteur treatment to be successfully applied.
- (2) The patient should be sent to Salisbury for treatment at once. Delays are dangerous.
- (3) The fullest information should be sent to the Health Department as to date when bitten, locality, fate of dog, and especially reasons for supposing the dog to be mad.

[1st July, 1912.

RABIES.

SEVERAL cases have recently occurred where dogs having bitten a person or persons, were immediately destroyed and report made that they were possibly infected with rabies. In such cases it is impossible for the Veterinary Department to say in less than 18 to 20 days whether the animals were infected or not, and then only when the head of the dog concerned is received at the laboratory in a good state of preservation. Thus valuable time is lost in the treatment of persons bitten, which may lead to fatal results.

In all cases the suspected animal should, if possible, be secured by a strong collar and chain and the circumstances reported by telegram to "Veteran," Salisbury, when full instructions will be given as to the treatment and observation of the suspected animal.

SUMMARY OF THE "GAME LAW CONSOLIDATION ORDINANCE, 1906," AND REGULATIONS ISSUED THEREUNDER.

The Ordinance divides the game into three distinct classes, described as follows :—

- (a) Birds and Small Buck.
- (b) Bushbuck, Hartbeest, Impala, Lechwe, Pookoo, Roan and Sable Antelope, Sitatunga, Tsessebe, Waterbuck, and Wildebeest.
- (c) Royal Game, which includes Eland, Elephant, Giraffe, Gemsbok, Hippopotamus, Inyala, Koodoo, Ostrich, Rhinoceros, Springbuck and Zebra.

The shooting season for Class "A" is as follows :—

In Mashonaland :

Birds from 1st May to 30th September.

Small Buck from 1st May to 31st October.

In Matabeleland :

Birds and Small Buck from 1st May to 31st October.

To shoot in Class "A" a licence costing £1 per annum is required. This entitles holders to hunt in both Provinces during the open season.

Class "B."—The season opens on 1st July and closes on 30th November in both Provinces. The licence fee is £25 for non-residents and £5 for persons having their domicile in Southern Rhodesia. This licence entitles the holder to shoot up to 15 head, which number may be increased to a total of 25 upon payment of a further sum of £15 in the one case and £5 in the other.

Class "C."—The Administrator may, if he is satisfied that the animals are actually required for scientific purposes, grant to the holder of a game licence permission to shoot or capture any of the species included in this Class. Such permit requires a £5 stamp. Applications in writing, together with proof of *bona-fides*, should be addressed to the Director of Agriculture.

Game for Farming Purposes.—Permits are granted for the capture of Eland, Ostrich, Zebra or other animals for the purposes of breeding or farming. Such permits require a stamp of the value of £1 and remain in force for six months. Application, accompanied by a sworn declaration, should be made through the Director of Agriculture or the Civil Commissioner of the district.

Game Injuring Crops.—The occupier of any cultivated land or any person acting under the authority of such occupier, may at any time destroy game actually doing damage on such land.

Elephants on Occupied Farms, Melsetter.—The destruction of Elephants when found on occupied farms on the High Veld in Melsetter District is authorised (*vide* Government Notice No. 284 of 1908).

Tsetse Fly, Hartley District.—Government Notice No. 201 of 1912 withdraws the Close Season for Class "B" until 30th June, 1913, in the area in the Hartley district bounded as follows :—From the Railway bridge on the Umfuli River, thence north-westwards along the Umfuli River to where it joins the Umniati River, thence southwards along the Umniati River to where it joins the Umsweswe River, thence eastwards along the Umsweswe River up to the drift at the Lydia Mine, thence along the old road from Lydia Mine to Etna Mine and to Inez Mine, thence northwards along the road from Inez Mine to Hartley, thence in the direction of the Railway bridge to the starting point on the Umfuli River. This notice also transfers from Class "C" to Class "B" Eland, Koodoo, and Zebra so far as that area is concerned. Under Government Notice No. 129 of 1909 game in Class "B" may be shot without a licence in this area.

Game in Class "A" may be hunted in the close season until further notice on private land in the Melsetter district by holders of a licence.

Protected Areas.—No game may be hunted or killed within the limits of the Commonage or Townlands of Bulawayo and within a radius of two miles of the Court House, Gwelo, or within the Urungwe Game Sanctuary, as defined by Government Notice No. 237 of 1906.

“Locust Birds” are strictly protected, *vide* Government Notice No. 121 of 1907.

Export of Game.—No living Game or the Eggs of any Game Birds may be exported beyond the limits of Southern Rhodesia without a written permit.

Shooting on Private Land.—A licence does not entitle the holder thereof to shoot on private land without the permission of the land-owner.

No. 243 of 1912.]

[18th July, 1912.

GAME LAW CONSOLIDATION ORDINANCE, 1906.

UNDER and by virtue of the powers vested in me by section 4 (2) of the “Game Law Consolidation Ordinance, 1906,” I do hereby suspend the operation of the said Ordinance, in so far as it relates to the destruction of hippopotami, on the farms Impofhoe and Hippovale, in the district of Hartley, and in such portions of the rivers Serui and Umfuli as are contiguous to the said farms, for a period of one year from the 19th July, 1912.

No. 390 of 1912.]

[19th December, 1912.

PROTECTION OF LOCUST BIRDS.

UNDER and by virtue of the powers vested in me by the “Game Law Consolidation Ordinance, 1906,” I do hereby declare that the following Locust Birds:—

- (1) Great Locust Bird or White Stork (*Ciconia alba*);
- (2) Lesser Locust Bird or Nordmann’s Pratincole (*Glareola melanoptera*);
- (3) Small White Heron or Cattle Egret (*Bubulcus ibis*);
- (4) Wattled Starling (*Dilophus carunculatus*);

are added to class “A” of the said Ordinance, and shall be strictly protected, and not hunted or destroyed, throughout Southern Rhodesia for a period of five years from date hereof.

No. 114 of 1913.]

[10th April, 1913.

HIPPOTAMII: SUSPENSION OF OPERATIONS OF GAME ORDINANCE.

UNDER and by virtue of the powers vested in me by section 4 (2) of the “Game Law Consolidation Ordinance, 1906,” I do hereby suspend the operations of the said Ordinance in so far as it relates to certain hippopotami in the Ingesi River, in the native district of Insiza.

No. 240 of 1910.]

[1st September, 1910.

INSECT PESTS.

UNDER and by virtue of the powers vested in me by the “Nurseries Ordinance, 1909,” I hereby proclaim the undermentioned insects to be pests within the meaning of the said Ordinance:—

The Red Scale (*Chrysomphalus aurantii*).

The Oleander Scale (*C. hederæ*).

The Circular Purple Scale (*C. aonidum*).

Ross’s Black Scale (*C. rossi*).

The Purple or Mussel Scale (*Lepidosaphes beckii*).

The Long Scale (*L. gloverii*).

The White Peach Scale (*Aulacaspis pentagona*).

Woolly Aphis or American Blight (*Schizoneura lanigera*).

No. 228 of 1912.]

[11th July, 1912.

IMPORTATION OF PLANTS REGULATION ORDINANCE, 1904.

UNDER and by virtue of the powers vested in me by the "Importation of Plants Regulation Ordinance, 1904," I do hereby declare and make known that Government Notices No. 306 of 1911 and No. 35 of 1912 are hereby repealed, and section 17 of the Regulations published under Government Notice No. 141 of 1906 is hereby repealed and the following regulation substituted in lieu thereof :—

- "17. The introduction into Southern Rhodesia of any plant, not being seed, fruit, bulb, tuber, cut flower, vegetable or vegetable transplant originating in the Union of South Africa, not grown in a nursery registered at the Department of Agriculture, Pretoria, under the 'Agricultural Pests Act, 1911,' is prohibited, except under special permission from the Director of Agriculture, Salisbury, Southern Rhodesia, who may impose such conditions in regard to such importation as he may think fit."

No. 319 of 1912.]

[3rd October, 1912.

IMPORTATION OF POTATOES INTO SOUTHERN RHODESIA.

UNDER and by virtue of the powers vested in me by the "Importation of Plants Regulation Ordinance, 1904," I do hereby cancel the regulations published under Government Notice No. 309 of 1909, and do substitute the following in lieu thereof :—

- (1) No person shall introduce into Southern Rhodesia from outside British South Africa any consignment of potatoes unless accompanied by a statement on oath from the consignor stating fully in what country, and district of that country, the potatoes were grown, and a certificate from the Department of Agriculture or other responsible Government body or official institution of that country to the effect that the disease known as "warty disease" or "black scab," caused by the fungus *synchytrium endobioticum* Percival, is not known to occur on the farm or premises on which the potatoes were grown. Any consignment not accompanied by such documents will be liable to be seized and destroyed.
- (2) Any consignment of potatoes imported from other parts of South Africa or from overseas, if found on inspection to be infested with the pest known as "root gall worm" (*hedeoedera radicola*) will be refused admittance to Southern Rhodesia or destroyed.
- (3) Should any consignment on arrival be found to be infested with "warty disease" or "black scab," it will be totally destroyed.
- (4) Any person guilty of a contravention of these regulations will be liable to a fine not exceeding £10.

No. 249 of 1908.]

[27th August, 1908.

PROTECTION OF TREES.

IT is hereby notified for public information that any person who shall cut down for use as fuel, or for any other purposes than *bona-fide* farming, mining or manufacturing purposes, or cause to be so cut down the "Wild Westeria" (native name M'Pakwa or M'poea) tree, will be liable to prosecution for contravention of the provisions of the Forest and Herbage Preservation Act, 1859, and upon conviction to a fine not exceeding £100, or to imprisonment with or without hard labour for a term not exceeding six months, or to such fine and imprisonment, or to such imprisonment without a fine.

No. 91 of 1913.]

[20th March, 1913.]

DESTRUCTION OF WILD CARNIVORA.

IT is hereby notified for public information that His Honour the Administrator has been pleased to cancel Government Notices No. 216 of 1911 and No. 387 of 1911, as from the 31st instant, from which date rewards for the destruction of wild carnivora will be discontinued.

No. 81 of 1913.]

[13th March, 1913.]

ESTABLISHMENT OF POUND ON FARM PAGATI.

UNDER and by virtue of the powers vested in me by section 5 of "The Pounds and Trespasses Ordinance, 1903," I do hereby declare and make known that, at the request of the Civil Commissioner, Bulawayo, a pound has been established on the farm Pagati, in the district of Matobo, and that the said pound shall be available for the public from 15th March, 1913.

No. 148 of 1913.]

[22nd May, 1913.]

ESTABLISHMENT OF A POUND AT MARANDELLAS.

UNDER and by virtue of the powers vested in me by section 5 of "The Pounds and Trespasses Ordinance, 1903," I do hereby declare and make known that, at the request of the Civil Commissioner, Salisbury, a pound has been established at Marandellas, and that the said pound shall be available for the public as from the 5th May, 1913.

No. 149 of 1913.]

[22nd May, 1913.]

ESTABLISHMENT OF A POUND AT BINDURA.

UNDER and by virtue of the powers vested in me by section 5 of "The Pounds and Trespasses Ordinance, 1903," I do hereby declare and make known that, at the request of the Civil Commissioner, Salisbury, a pound has been established at Bindura, and that the said pound shall be available for the public as from the 12th May, 1913.

No. 150 of 1913.]

[22nd May, 1913.]

ESTABLISHMENT OF A POUND AT UMZINGWANE.

UNDER and by virtue of the powers vested in me by section 5 of "The Pounds and Trespasses Ordinance, 1903," I do hereby declare and make known that, at the request of the Civil Commissioner, Bulawayo, a pound has been established at Umzingwane, on the Umzingwane Reserve, in the magisterial district of Bulawayo.

No. 151 of 1913.]

[22nd May, 1913.]

ABOLISHING OF POUND ON FARM STONEHAM.

UNDER and by virtue of the powers conferred on me by section 5 of "The Pounds and Trespasses Ordinance, 1903," I hereby, at the request of the Civil Commissioner, Bulawayo, abolish the pound established on the farm Stoneham, in the district of Bulawayo, under Government Notice No. 165 of 1912.

No. 152 of 1913.]

[22nd May, 1913.]

ABOLISHING OF POUND AT SWAITHE'S FARM.

UNDER and by virtue of the powers conferred on me by section 5 of "The Pounds and Trespasses Ordinance, 1903," I hereby, at the request of the Civil Commissioner, Bulawayo, abolish the pound established on Swaithe's Farm, Filabusi Siding, in the magisterial district of Bulawayo, under Government Notice No. 24 of 1907.

No. 211 of 1909.]

[16th September, 1909.

PRODUCE FROM NATAL AND TRANSVAAL.

UNDER and by virtue of the power vested in me by section 8 (2) of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby prohibit the introduction from Natal and the Transvaal of the undermentioned produce thereof :—Grass, straw, hay, lucerne hay, forage, green lucerne, sugar cane, or any other bedding or fodder plant.

FULL TEXT OF "HERBAGE PRESERVATION ORDINANCE, 1913."

AN ORDINANCE to prevent the destruction of Herbage, Trees and Shrubs by Fire.

BE IT ENACTED by the Administrator of Southern Rhodesia, with the advice and consent of the Legislative Council thereof, as follows :—

So much of the "Forest and Herbage Preservation Act, 1859," of the Colony of the Cape of Good Hope, and of any amendment thereof, as may be inconsistent with the provisions of this Ordinance, is hereby repealed.

Any person who shall, without lawful authority so to do, wilfully or by gross negligence set fire to or kindle any fire which by spreading shall set fire to any tree, shrub, bush, brushwood, undergrowth or grass not his property, shall be guilty of the offence of contravening this section, and shall upon conviction be liable to a fine not exceeding £100, or, in default of payment of any fine imposed, to imprisonment with or without hard labour for a period not exceeding one year, or to corporal punishment in any number of lashes or cuts with a cane or rod not exceeding fifteen, or to the above imprisonment without the option of a fine, or to any two of the above-mentioned punishments.

All Magistrates and Assistant Magistrates, and all Native Commissioners and Assistant Native Commissioners, in respect of persons over whom they have jurisdiction by law, shall have jurisdiction to impose summarily the punishment above set out.

The Court before which any conviction for a contravention of section two of this Ordinance takes place may, during or immediately after the trial, take and hear evidence as to the amount of damage caused by any contravention of the section, and may assess such damage to an amount within the civil jurisdiction of such Court and give judgment against the offender for the amount of the damage so assessed; provided always that such proceedings shall not be taken unless the offender has had reasonable notice that the amount of damage caused will be enquired into.

Nothing in this Ordinance shall be taken to affect the right of any person aggrieved to recover damages by civil action for any loss sustained by himself, unless he shall have availed himself of the provisions of section four hereof.

In such areas as the Administrator, on the petition of an actual majority of owners or occupiers representing not less than two-thirds of the land in such areas, may prescribe, any owner or occupier of land who desires to guard against fires crossing the boundaries thereof, may call upon the occupier of any adjoining land to contribute one-half of the labour or cost necessary to provide sufficient fire-guards on the common boundary. If any person so called upon shall refuse or neglect to contribute as aforesaid, the person so calling on him may proceed with the construction of a fire-guard and recover half the necessary cost of such construction from such first-mentioned person. The width of a fire-guard shall be such as the Administrator may prescribe at the instance of the petitioners, but in no case shall it be less than fifteen feet on each side of the common boundary. For the purposes of this section the term "owner or occupier" shall mean, in respect of native reserves, the British South Africa Company.

Any person who is lawfully upon the land of another or upon any road, outspan or vacant land, shall carefully and properly extinguish any fire

kindled or used by him, and until he has so done shall not proceed such a distance from any such fire as to be unable to control it by himself or his servants.

No person shall pursue any kind of animal, or knowingly enter upon the land of another with the intention of pursuing any kind of animal, without the consent of the owner or occupier of such land.

No person shall take or remove honey or bees from the land of another without the consent of the owner or occupier of the land upon which the honey or bees may be.

Any person trespassing upon any land enclosed by a sufficient fence, or being found upon such land away from a recognised road or path, shall be liable to the penalties hereinafter set out.

Every prospector proceeding to prospect for minerals, under and by virtue of any prospecting licence, upon occupied land, shall give notice to the occupier of his intention to prospect.

Every person, before proceeding to burn growing or standing herbage, grass or bush upon his own land, shall give reasonable notice to adjoining occupiers of his intention so to do. Such notice shall state as nearly as may be done the time at which such burning will take place.

Nothing in this Ordinance shall be taken to prevent a person, when his life, person, or property are in danger from an approaching fire, from setting alight to and burning grass, herbage, or bush, in the manner commonly known as counter-firing, in order to prevent such injury or loss; provided that reasonable care is taken that a fire kindled does not spread beyond the limits necessary to secure safety from injury and loss.

If any servant when acting under the direction or command of his employer by omission or by act of commission shall contravene any of the provisions of this Ordinance, then such employer and the servant may both or either of them be prosecuted, and if convicted punished under this Ordinance.

The penalties for any act or omission in contravention of the provisions of this Ordinance shall be, unless otherwise specifically provided—

- (1) for the contravention of sections eleven and twelve a fine of £5, or in default of payment of any fine imposed, imprisonment with or without hard labour for a period not exceeding one month;
- (2) for the contravention of sections seven, eight, nine and ten a fine of £10, or in default of payment of any fine imposed, imprisonment with or without hard labour for a period not exceeding three months;

provided that should any act or omission complained of also result in a contravention of section two, prosecution may follow under that section.

Department of Posts and Telegraphs,

Southern Rhodesia.

Postal Notice No. 12 of 1913.

AGRICULTURAL PARCELS POST.

IT is hereby notified for public information that, on and after the 1st August, 1909, any article produced, and, if manufactured, produced and manufactured within Southern Rhodesia may be transmitted by Agricultural Parcels Post at the reduced rate of threepence per lb. or fraction thereof, up to a limit of eleven lbs. in weight.

The Agricultural Parcels Post is designed to bring the producer into direct communication with the consumer, and is available for the transmission of :—

Biscuits	Dried Meats	Plants
Bread	Eggs	Poultry
Butter	Flour	Seeds
Confectionery	Flowers	Sugar
Cigarettes	Honey	Tobacco
Dried & Bottled Fruits	Jam	Wool Samples

and other articles produced within Southern Rhodesia. It does not extend beyond the borders of Southern Rhodesia.

The senders of articles at the reduced tariff applicable to the Agricultural Parcels Post will be required to sign a declaration that the contents are the *bona fide* produce of Southern Rhodesia.

The limits of size and weight, and the general regulations, are those applicable to the Inland Parcels Post.

G. H. EYRE,

Postmaster General.

General Post Office, Salisbury,
31st March, 1913.

REDUCED RATES FOR SALT (COARSE AND ROCK) FOR STOCK FEEDING.

THE Beira and Mashonaland and Rhodesia Railways announce that with effect from 1st March, 1913, coarse and rock salt in bags, in lots of not less than 15 tons or paying therefor, will be conveyed *via* Vryburg to all stations on these lines—Rhodesia Katanga Junction Railway excepted—at a rate of 1d. per ton per mile, owner's risk.

Reductions are also made in the rate for salt of similar description conveyed under the foregoing conditions from Beira to stations in Rhodesia; for particulars apply to Traffic Manager and Stationmasters.

RATE FOR ARSENITE OF SODA FOR DIPPING PURPOSES.

THE Beira and Mashonaland and Rhodesia Railways announce that with effect from 1st March, 1913, arsenite of soda, declared to be for cattle and sheep dipping purposes, will be carried at the rates applicable to cattle and sheep dip and dip powder, owner's risk.

RATE FOR GUANO AND FERTILISERS.

THE Beira and Mashonaland and Rhodesia Railways announce that with effect from 1st March, 1913, the scale of rates for the carriage of guano and fertilisers at owner's risk, minimum one ton or paying therefor, is revised as follows :—

Between All Stations.

1. Beira to Broken Hill, including Selukwe and West Nicholson Branches, also Vryburg to Bulawayo and beyond, except on sections 2 and 3 hereunder : Distances not exceeding 480 miles, 2d. per ton per mile, subject to a maximum of £2 per ton. 481 miles and over, 1d. per ton per mile.

2. Lomagundi, Mazoe and Blinkwater Branches : 2d. per ton per mile.

3. Rhodesia Katanga Junction Railway—Broken Hill—Congo Border : Minimum 5 tons, 6d per ton per mile. Minimum 1 ton, 7d. per ton per mile. Minimum charge 2s. 6d. per ton.

REDUCED RATES FOR CEMENT FOR IRRIGATION PURPOSES.

THE Beira and Mashonaland and Rhodesia Railways announce that with effect from 1st January, 1913, cement certified to be for use in connection with irrigation works for agricultural purposes will be conveyed over all sections of these lines (Broken Hill-Congo Border section excepted) at the rates and conditions laid down in clause 40 of Goods Tariff Book No. 5.

TEMPORARY REDUCED RATE FOR HAY.

THE Beira and Mashonaland and Rhodesia Railways announce that, with effect from 1st April, 1913, the following reduced rates for Hay will apply as a temporary measure, station to station, owner's risk, minimum charge as for four-ninths the marked carrying capacity of the truck:—

Hartley to Bulawayo, £1 14s. 8d. per ton; Gadzema to Bulawayo, £1 15s. per ton; Makwiro to Bulawayo, £1 16s. 6d. per ton; Norton Siding to Bulawayo, £1 17s. 6d. per ton.

RATE AMENDMENTS.

THE Beira and Mashonaland and Rhodesia Railways announce that, with effect from 1st March, 1913, the following amendments have been made to Goods Tariff Book No. 5:—

Page 22 : Flour of Sulphur—reclassified at rate No. 3.

Page 28 : Scalecide (for spraying trees) is included as spraying materials in clause 57.

Page 34 : Petrol and Paraffin Tractors, used solely for ploughing and agricultural purposes, are included as agricultural implements in clause 57.

REDUCED RATE FOR OILCAKE.

THE Beira and Mashonaland and Rhodesia Railways announce that, with effect from 1st April, 1913, the rate for Oilcake for cattle feeding will be reduced, as a temporary measure, from 3rd to 4th class in minimum consignments of 5 tons, or paying therefor, at owner's risk.

From Union Ports, S.A.R. Tariff No. 13 applies to Vryburg or Mafeking, as the case may be, plus 4th class rate onwards, subject to the foregoing conditions.

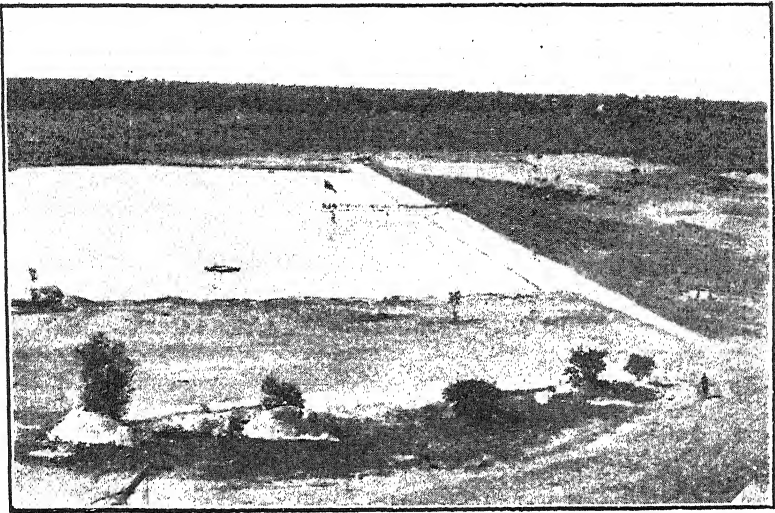
REDUCED RATES FOR OATS AND BRAN.

THE Beira and Mashonaland and Rhodesia Railways announce that the temporary reduced rate for Bran from the South to Bulawayo, in operation since December last, will be withdrawn on 30th June, 1913.

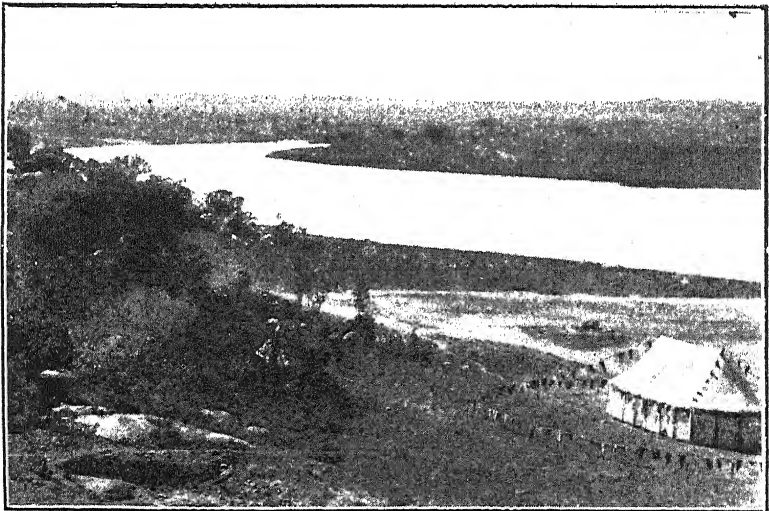
With effect from 1st July, 1913, the rate for Bran and Oats for stock feed from the South will be £3 13s. 6d. per ton of 2,000 lbs. from Vryburg to Bulawayo, owner's risk.

CITRUS CULTIVATION.

THE services of Mr. C. E. Farmer, Adviser on Citrus Cultivation to the British South Africa Company, are available. The British South Africa Company will be pleased to receive applications from farmers desirous of obtaining advice from Mr. C. E. Farmer on citrus cultivation, and to place his services at the disposal of the farming community, in so far as his duties permit. Applications, which will be dealt with in order of date, should be addressed to the Director of Land Settlement, Salisbury. No fee will be charged for Mr. Farmer's services.



Municipal Dam, Salisbury.



Municipal Dam, Salisbury.



THE RHODESIA
Agricultural Journal.

*Edited by the Director of Agriculture,
assisted by the Staff of the Agricultural Department.*

PUBLISHED BI-MONTHLY.

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AUGUST, 1913.

[5s. per annum

Editorial.

Correspondence on subjects affecting the farming industry of Southern Rhodesia is invited. Enquiries will be replied to direct, or through the medium of the JOURNAL. An interchange of ideas and suggestions between farmers will be particularly welcomed. Contributions of a suitable nature for insertion in this JOURNAL will be much appreciated. All communications regarding these matters, and advertisements, should be addressed to the Editor, Department of Agriculture, Salisbury.

LECTURES ON AGRICULTURE.—Commencing on the 11th August, it is proposed to repeat the course of lectures given last year in Salisbury, with, however, a few modifications which experience shews to be desirable. It is hoped the endeavour to give instruction in this way to existing and prospective farmers will receive the same measure of support which rendered the course a success on the previous occasion.

The lectures will be held in the High Court Buildings, Salisbury, and the whole or any part of the course is open, free, to all interested. For the encouragement of those residing at a distance the cost of railway return tickets (second class) will be refunded to students attending the entire course. The examinations are optional, but to those who satisfactorily pass

them certificates will be awarded; also prizes to the candidate obtaining highest marks in each subject, and a gold medal for the highest aggregate in all examinations. A prize is offered for the best essay on any subject dealt with in the lectures, to be submitted within three months of the conclusion of the course. A series of popular lectures has, in addition, been arranged, which will be delivered on certain evenings during the course by Dr. A. M. Fleming, C.M.G., Messrs. F. Eyles, M.L.C., G. Duthie, C. D. Wise, C. E. Farmer, and R. Jack.

A number of excursions has been organised, which will include visits to the following places of interest:—The Government Experimental Farm, Gwebi; the Laboratories of the Department of Agriculture; the Inoculation Camp and Forest Nurseries; also, with the kind permission of the owners, to Mr. Pretorius's farm, "M'gutu," Mr. Ross's farm, "Bluff-hill," and to Mr. von Hirschberg's plot on the Western Commonage.

VISIT TO ENGLAND OF RHODESIAN FARMERS, 1914.—The generous invitation issued by Sir Owen Phillips, Chairman of the Union-Castle Steamship Company, to farmers in the Union and Rhodesia is already well known throughout this Territory, but it cannot be out of place to publish a *verbatim* report of this announcement, taken from *South Africa*, made on the occasion of the recent South African Dinner in London. On that occasion, Sir Owen Phillips said:—

"Gentlemen,—Before calling upon the next speaker, Earl Grey, to propose the toast of 'Rhodesia,' I would like to refer to one matter which I accidentally omitted to mention when I was touching on agriculture in South Africa just now. My company, in order to enable the South African farmers to get the best practical knowledge of what is being done in this country, have resolved to invite fifty delegates to come over, namely, ten from each of the Provinces—the Cape, Natal, Orange Free State, and the Transvaal—and also ten from Rhodesia, representative of all sections of farming; the delegates to be selected by the Executive Committee of the principal agricultural association of each Province, and shall represent, as far as possible, distinct districts in the Province,

and no district to send more than one delegate. Each delegate shall be a practical working farmer, whose principal means of subsistence is obtained from farming, but he shall not be in the employ of the Government. One-half of the delegates selected shall be Dutch or of Dutch extraction, but this shall not apply to Rhodesia. The delegates shall travel as the guests of the Union-Castle Company, first-class, by mail or intermediate steamer. It is proposed that the President of this agricultural tour shall be Mr. J. A. Naser, M.L.A., President of the South African Dry Farming Congress, and that the Organising Secretary shall be Dr. William McDonald. I hope this will result in South African farmers having an opportunity next June of seeing the very latest things which are being done in this country in farming, and I hope also that they may be able to bring some benefits to this country by teaching us something, and that they may take back to their own country knowledge which they will be able to collect on this side. It is with a view to helping forward the development of South Africa that I propose offering that suggestion."

OUR AGRICULTURAL SHOWS.—At the time of writing, agricultural shows have been held this year at Hartley, Gwelo, Bulawayo, and Umtali, and the organisers at each centre are to be congratulated on the success attending their efforts. On the whole, the produce exhibited was of a very high standard, but it is remarkable how certain classes are grown and exhibited to the exclusion, almost, of others. Maize easily takes pride of place in the exhibits, and that at the Umtali Show was perhaps the best collection of its kind ever seen in Rhodesia. The two varieties mainly grown—Hickory King and Salisbury White—have reached a high standard of excellence, and it may be claimed that for this class—Flat Whites—Rhodesia is second to none in the world. Yellow mealies are at a discount, and are only to be recommended for cultivation under exceptional circumstances, such as when late rains give a short growing season and drought-resistant varieties are imperative. The class which ranked next to mealies in prominence at the shows was potatoes, in which section competition was very keen. The best lot was shewn at Gwelo. The veld and artificial hay classes also deserve mention, although here the tendency is to exhibit stuff cut too late in

the season, and is consequently of less value than would be the case if cut earlier.

One of the best exhibits at the Bulawayo Show was Majorda melons, and if the quantity produced per acre of the general crop were up to sample, the standard would be exceedingly high. In contrast to the foregoing were the fewness of the entries for such important grains as wheat, oats, barley and rapoka, as well as for peanuts and sweet potatoes. This is the more surprising as these crops are now quite largely grown. What exhibits there were, however, were of high quality. On the other hand, it is gratifying to find on the shows exhibits of varieties of crops only lately introduced to the notice of farmers, such as sunflowers, linseed and buckwheat, and these were of excellent merit. The display of beans at Umtali was distinctly good.

Butter this year was in evidence in greater quantity than heretofore, while the average quality was better. This was particularly the case at Umtali. A very interesting exhibit, which was on view at each show, was the cheeses sent by Messrs. Creighton and Bowe, of "Moonto," Nyamandhlovu, and Mr. C. M. Parry, of the same district. A competent judge expressed his surprise and delight at one of Messrs. Creighton and Bowe's cheeses, which he described as of true cheddar quality and such as could not often be obtained in South Africa. This assurance must be gratifying to the maker, and should bring home to farmers generally the fact that it is possible to produce a marketable article in this country. We have on various occasions, in publishing figures of our imports, drawn attention to the regrettable shortfall in the production of items of food which ought to be supplied locally, and in the list cheese has always occupied a prominent place. During 1912, for instance, we imported cheese to the value of £6,922, of which amount £6,019 came from overseas. For the four months of the present year our cheese imports amount to £2,809—a considerable increase over the quantity imported for the corresponding period last year. There is no reason why all this money should go out of the country. It apparently pays to send cheese from Europe to Rhodesia, and surely it would pay to manufacture locally! The exhibitors at the shows have pointed the way, and it is to be hoped that before

long we shall be able to obtain the majority, if not all the cheese we require, in this country. These two producers, it may be mentioned, last season disposed of several tons of cheese, and find it more remunerative than butter, unless the latter commodity fetches 2s. per lb., which is but exceptionally the price paid to farmers.

An encouraging sign at the Umtali Show was the number of new competitors representing also new districts, such as Umrodzi and Makoni. As it happened, they beat the older established localities, both for the championship for the aggregate of exhibits and for Mr. C. D. Wise's Maize Challenge Cup.

Hartley's first venture at a show was a distinct success, and effectively demonstrated the agricultural possibilities of the district.

Owing to the very deficient rainfall in Matabeleland, the Bulawayo Show was much handicapped; indeed, at one time it was very doubtful if it could be held at all. Then the continued necessity for restricting the movement of cattle over large areas precluded the possibility of cattle being shewn. Implements were conspicuous by their absence; this was the only show in the country where such was the case. It must be confessed that in these circumstances the show could not do Matabeleland justice, though, at the same time, there were many exhibits of interest. Every credit is due to the Society for maintaining the annual show under the adverse conditions, and we feel sure this courageous policy will reap its reward when better times return.

Gwelo, after an interval of several years, re-entered the lists, and great credit is due for the enterprise which resulted in such a capital show. Implements here formed a conspicuous feature, and merchants declared themselves well pleased with the results, although direct business is not looked for on these occasions. The organisers of the Midlands Show were in the fortunate position of being able to provide classes for cattle unrestricted in any way. The result was a really great show of native cattle amounting to several hundreds; a wonderful exhibition of our indigenous foundation stock. Of European breeds, Shorthorns, almost all of which were sent from Rhodesdale, were prominent. Without the exhibits from this

estate, the show would have lost a good deal in interest. North Devon and Sussex bulls were good, but the Friesland breed was not well represented. Mr. Austin, of Que Que, carried off the principal honours for bulls.

At Umtali, only a few head of cattle could be exhibited, but amongst these there were some useful cross-bred dairy cattle and a few very nice Jerseys. Pigs, though not numerous at any show, were very fair, and indicated improvement as compared with previous years, both in quality and in preparation for exhibition. The same cannot be said of sheep and goats, and the exhibits were but moderate. In the class for the three best wethers at Umtali, one pen contained two wethers and one ewe, and in another all three were ewes! At this show, Mr. Rutherford, of Melsetter, had two pens of very nice grade Angoras.

There was a good show of poultry at Bulawayo, which is always well represented in these classes.

Horses were nowhere of any great merit, and a few animals entered again and again in different classes, both for competition and exhibition, carried off most of the prizes. There were a few nice spans of heavy draft and fast mules, but generally equines are evidently not a feature at present.

Hartley did not provide classes for live stock, being content in its initial venture to restrict the show to produce and implements.

At several shows an interesting exhibit of bees, supplemented by demonstrations by Mr. Sworder, of Hartley, attracted attention.

The Department of Agriculture as usual had exhibits demonstrating certain aspects of its work of instruction and research on behalf of the farmers of the country.

Gratifying as are these shows as an indication of the agricultural progress and prosperity of the country, they do not receive the support they ought from the farming community, and it must be admitted they are not as yet an adequate reflection of the true position of the industry. Competition would be keener and the various classes more representative if everyone who had stock or produce of sufficient merit to exhibit sent samples to the shows. There is plenty

of material which is not exhibited that would do credit to the exhibitor, although it may not win a prize. The enforced absence of cattle re-acts prejudicially on all other classes of exhibits, and no doubt when the present embargo can be safely removed the value and size of our agricultural shows will be considerably enhanced.

It is to be regretted that the date of the Salisbury Show precludes the possibility of its being referred to in these comparative criticisms.

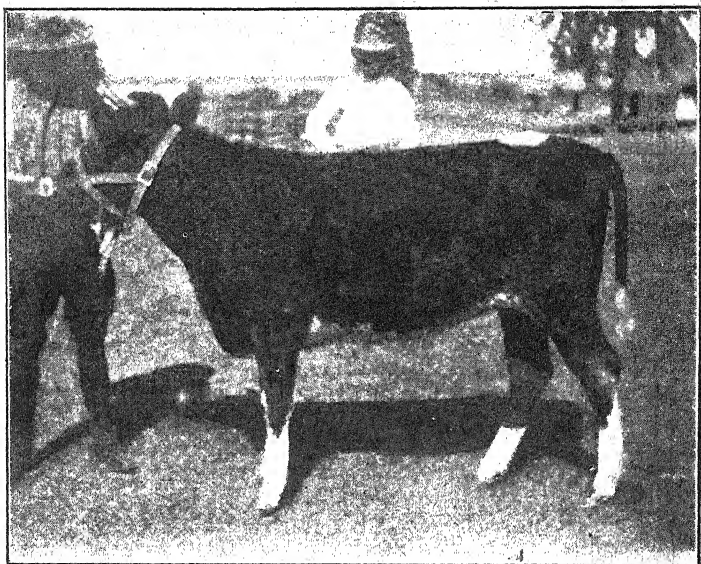
COMPULSORY DIPPING.—In his comprehensive paper on the proposals to enforce compulsory dipping, the Chief Veterinary Surgeon deals with a subject which is arousing wide attention at the present time, and which deserves the most careful consideration of farmers. Of the benefits of such a measure in certain districts there can be no doubt. We have local experience of this in those areas where, on account of the proximity of African Coast Fever, dipping has been made compulsory; but quite apart from the effective prevention of the spread of disease, the good results have been very apparent. The subject is not without material difficulties, and it would be inexpedient to enforce it in the face of any very strong opposition, but it is observable that those who have once adopted the practice become ardent advocates of its more general application.

THE SHORTHORN SOCIETY OF SOUTH AFRICA.—At the Gwelo Agricultural Show, a meeting took place to hear Mr. Cuthbert Pope, of Molteno, Cape Colony, on the subject of the encouragement of the Shorthorn breed of cattle in South Africa. He called attention to the formation recently of a society for the express purpose, consisting of the great majority of breeders and supporters of the breed throughout the Union. The Society, under the presidentship of Mr. E. W. Evans, M.L.A., of Maritzburg, is the direct outcome of a movement whereby the interests of each individual breed of pure stock, large and small, is being entrusted to a society affiliated to the South African Stud Book Association, which preserves, registers, and publishes the pedigrees of pure-bred animals. By this means, whilst the advantage is maintained of all such pure

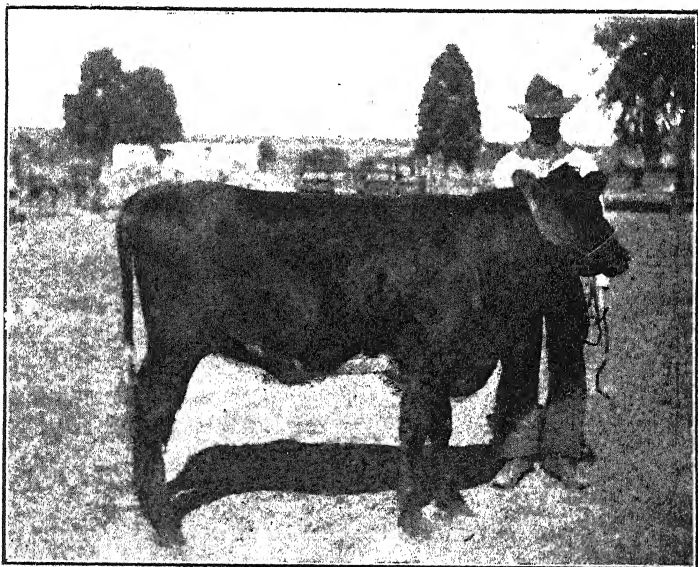
stock being recorded by the same organisation embracing within its membership many kindred interests and all who are concerned in the one common cause of the betterment of South African live stock, yet the breeders, judges and others interested in any particular breed have, through its society, a means of combining for the promotion of their joint particular interests. Originally, before the days of Union, similar attempts were made to encourage stock-breeding in each Colony, but it was soon found that the basis of such organisations must rest on the breed, and not depend on territorial distinctions. The ideal of a number of breed societies, all connected together through a common stud book, is now being realised in the Union, and the movement must necessarily interest and deeply affect Rhodesian stock-breeders, who draw so much of their stud stock from their southern neighbours. As the outcome of Mr. Pope's remarks, it was decided on the spot to endeavour to form a Rhodesian branch of the Shorthorn Society of South Africa, and a committee consisting of Messrs. E. A. Hull, of Westacre Creek, J. J. Austen, of Que Que, and Mr. Barnett, Rhodesdale, was formed for the purpose of carrying the proposal into effect. All interested should communicate with any of the above-named gentlemen.

As indicating the scope and aims of this Society, the following extracts are culled from a manifesto issued by the Secretary, the Hon. Henry J. Scott, Box 33, Benoni, Transvaal, copies of which may be had on application to the Department of Agriculture, Salisbury:—

“South Africa has long been an importer of Shorthorn cattle, but, owing to disturbing conditions, on a comparatively limited scale, while her breeders have been mainly confined to the older districts. The great and rapid progress now being achieved in South African farming is shared in a marked degree by Shorthorns throughout the country. New herds are being started, many valuable bulls and highly bred females are being imported, and the demand for young, pure-bred stock is far beyond the supply. The time has come when Shorthorn breeders could no longer afford to go on without some definite organisation; they felt that such matters as the appointment of Stud Book Inspectors and Judges at agricultural shows, the regulations regarding entry in the Stud Book and the drawing up of a standard of excellence, were matters



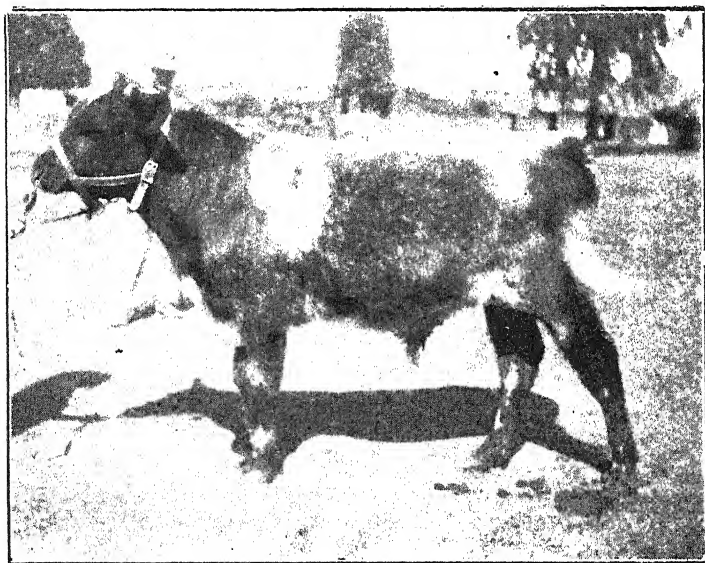
Shorthorn Heifer, "Gem," imported from England by the
B.S.A. Company.



Shorthorn Heifer imported from England by the B.S.A. Company.



Recent importations from England by the B.S.A. Company. Red and White Heifer—beef type; Roan Heifer—dairy type.



Shorthorn Bull, "Royal Crown," recently imported from England by the B.S.A. Company.

which they should themselves deal with; while by offering special prizes, advising as to the classification to be provided for Shorthorns at shows, and by publishing information regarding the breed, a society could render much assistance to its members.

"It was recognised that the S.A. Stud Book Association was the best medium for the publication of a herd book, and that the excellent work accomplished in the past by that association entitled it to the support of breeders throughout the country. It was therefore decided to continue the entry of Shorthorns and Lincoln Red Shorthorns in the S.A. Stud Book, and to work 'in conjunction with and as auxiliary to the S.A. Stud Book Association.'

"*The Shorthorn Society of South Africa* was founded in October, 1912, and a liberal constitution adopted, of which the following is a summary:—

" 'Objects. (a) To further the interests of the cattle breeding industry in South Africa, and more especially to encourage the breeding of Shorthorn and Lincoln Red Shorthorn cattle, and to promote impartially all the various types and strains of such cattle.'

" '(b) To compile for the purpose of registration in the S.A. Stud Book the pedigrees and particulars of all Shorthorn and Lincoln Red Shorthorn cattle proposed to be entered therein.

" '(c) To investigate and report upon cases of doubtful pedigree, identification, qualification and other matters; and to undertake the arbitrament upon and settlement of disputes relating to Shorthorn cattle and the breeding thereof.' "

REGISTRATION OF GRADE CATTLE.—There is now a large number of grade heifers in the country, either first, second, or third cross, bred from a particular European breed. As time goes on, those animals whose breeding can be proved by documentary evidence will be of considerably greater value than similar animals whose exact breeding cannot be vouched for. The registration of such animals cannot be effected through the agency of the Union Stud-book Association as in the case of pure-bred animals, and the time is not ripe to form any elaborate organisation to deal with the matter. It is, there-

fore, suggested that owners should keep careful private records, not necessarily of all their grade heifers, but of the best. The Animal Industry Branch of the Department of Agriculture is in a position to assist in starting and maintaining registers, and is prepared to arrange for the annual inspection of such herds and registers if desired by the owners, and, if circumstances permit, to officially certify them as correct and true and to advise regarding the same. It is thought that the system indicated, while it entails neither expense nor trouble to individuals, will pave the way towards and materially assist later on in the establishment of a more complete system of recording the pedigrees of grade stock.

RHODESIAN TOBACCO.—Tobacco growers are manifesting some anxiety concerning markets for the crop now cured and for the most part transferred to the Warehouse for grading. In quantity, the crop is expected to amount to more than double that of last year, and to approximate two and a half million pounds. Competent authorities declare that on the whole the quality is distinctly superior to last year's tobacco, although, of course, there is a certain amount that is inferior, as, indeed, there always must be. There is, however, in this huge quantity of one thousand two hundred and fifty tons of tobacco a great proportion of excellent bright leaf. Efforts are being made to secure a larger demand for our leaf, but it is to be remembered that it is in the nature of such a young industry that supply and demand cannot always keep pace as producer and manufacturer would wish. The only safe and sure way to make a success of tobacco growing in Rhodesia is to take the utmost care to produce the best article possible, and this must, in itself, secure a market and command a price. More is to be achieved in this way than by the most subtle schemes to manipulate the market.

Many planters, in spite of instructions and warning, still bale their leaf too moist. Others declare they can produce as good bright leaf by air curing as by flue curing, a fallacy which unfortunately is not exposed until the manufacturing or even the consuming stage is reached. This is bound to prejudicially affect the ultimate interests of growers as a whole, and we cannot impress too strongly upon all concerned the paramount importance of sparing no effort to produce leaf of good quality.

RAILWAY RATE REDUCTIONS.—On frequent occasions we have noted instances where ignorance has been expressed of reductions in railway rates made for the benefit of the farming community, and we would particularly draw attention to a list, which includes such reductions, published in this issue.

We would also direct attention to the special notice which appears at the end of this JOURNAL to the effect that from 1st July, 1913, paraffin for generating power in engines will, under certain conditions, be conveyed by the Beira and Mashonaland and Rhodesia Railways at the fifth-class rate. This reduction came into force some time ago, but it only applied to certain sections of the railway system. The reduction is now made applicable to the whole of the Beira and Mashonaland and Rhodesia Railways, and its general application will, we think, make it possible for the oil tractor to be used to a greater extent for agricultural purposes in this country.

WATER BORING.—Owing to the deficiency of rainfall during the past few seasons and the consequent drying up of springs and dams and the failure of other sources of the water supply, attention has been directed to the utilisation of subterranean water for stock, domestic and other uses. In response to a general request on the part of the farming community for assistance in the development of the underground supplies, the Commercial Branch of the British South Africa Company has purchased two of the most modern Shot Drills and one Percussion Drill. These machines are now in operation boring for water for farmers. The advantage of pure subterranean water for stock and domestic purposes cannot be overestimated, and it is hoped that now these drills have been procured farmers will take advantage of the opportunity offered. It would be of great assistance to the British South Africa Company if those who desire the use of these drills would make early application to the Secretary of the Company in Bulawayo, as by so doing not only would a saving in transport and working expenses be effected, but the Company would be in a better position to ascertain the number of drills necessary to meet the demand.

The terms upon which the drills may be obtained are as follows:—

1. The applicant will be required to furnish transport for the drill from the nearest railway station or siding or from the last farm on which the drill may be operating. (The weight of the drill is about ten tons, and to transport this one ox-wagon and span and one spare span will be required.)
2. The applicant will be required to furnish sufficient water and wood fuel for the constant working of the drill. This is estimated at about 400 gallons of water per diem, and about one wagon load of wood per week.
3. The applicant will be required to supply such rough native labour as may be required from time to time.
4. The British South Africa Company will charge the actual cost price of the operations plus six per cent. for capital outlay and 12 per cent. for maintenance and depreciation of the plant. It is anticipated that on this basis the cost of boring will not exceed 12s. per foot, including the necessary lining, which will be supplied by the Company.

In the event of monetary assistance being required for water boring, loans may be obtained from the Land Bank by approved applicants on the following terms:—

- (a) Small loans not exceeding £150 on the security of a promissory note for one year, bearing interest at the rate of 7 per cent., such promissory notes to be countersigned by two approved sureties.
- (b) Loans up to a sum of £2,000 on the security of a first mortgage over the applicant's farm. Such loans bear interest at the rate of 6 per cent. per annum and are repayable in gradually increasing instalments over a period of ten years, or they may be repaid at an earlier date if required. In cases where a first mortgage is already held by the Land Bank, a second mortgage may be accepted as security provided the value of the property warrants a second loan.

Applications for assistance from the Land Bank should be made direct to the Manager, P.O. Box 15, Bulawayo, from whom forms for the purpose may be obtained. Forms of application may also be obtained from the Estates Office, Salisbury, and the principal Civil and Native Commissioners throughout Southern Rhodesia.

OUR CONTRIBUTIONS.—In this issue we would draw attention to several articles of especial interest. The first deals with the projected school of agriculture, and indicates the lines on which it is proposed to establish such a college as soon as circumstances permit. Interesting papers will be found on tobacco by Mr. O. Zimmermann, of Darwendale, and on the woolled Persian breed of sheep by Mr. Harris, of Insiza. We cannot go so far as the writer, who claims that it has been proved "that for huge areas of South Africa this breed of sheep is the best to run," but there is reason to believe that the Arabi cross has in many cases done remarkably well in producing a large, quick-maturing lamb from Merino or native ewes. The writer also makes the assumption that sheep suited to arid countries are likely to do well in Rhodesia, whereas our experience is that flocks suffer in this country from the heavy rains and from rank grass, rather than from want of water. However, Mr. Harris himself has been using woolled Persian rams, so he speaks with some experience. A small pure-bred flock and some cross-breds are kept by Mr. Walker, of lower Umvutcha, near Bulawayo, whilst it is also possible to procure specimens in the Union.

This issue also contains some very valuable reports of research work, conducted by technical officers of the Department of Agriculture, in connection with subjects of prime importance to farmers of this country. These we commend to the careful perusal of our readers. In regard to these articles, we would specially refer to that dealing with Victoria wheat, contributed by Mr. Walters. It will be seen that the continuance of last year's experiments is remarkably successful. Not only has the wheat maintained its immunity to rust, but the yield of three bags per acre on unmanured land is distinctly good. In this connection it may be of interest to quote the wheat yields of Victoria, Australia, for the summer season:

1912-13, published in the Agricultural Journal of that State for May. These shew that the average yield per acre for the whole State was 12.58 bushels or $3\frac{3}{4}$ bags of 200 lbs. The best district shewed an average of 6 bags per acre; the poorest district an average of only 2.1 bags per acre. In 1911-12, the average for the whole State was only 2.9 bags per acre. It will, therefore, be seen that as far as yield is concerned Rhodesia compares very favourably with Victoria, and easily surpasses it on the returns obtained from winter wheats under irrigation. The results of these experiments are very encouraging, and it may be claimed that we are well on the way towards establishing in Rhodesia a wheat proof against rust, the importance of which it is not necessary to dilate upon. The experiments conducted by Mr. Blackshaw last year at the Gwebi Experiment Farm, with the object of ascertaining whether the use of fertiliser for maize production at present market prices is a profitable investment, created considerable interest amongst farmers, and we feel sure the results of his further experiments will be studied very closely. The best results obtained with the previous experiments shewed net profits of 19s. 4d. and 13s. 5d. per acre. This year the land previously utilised for the experiments was again planted with maize without a further application of fertiliser, and as will be seen from Table III., the total increases per acre in the two seasons, due to fertilisers applied in the first year, are respectively 1,306 lbs. for an expenditure of 19s. 6d., and 1,650 lbs. for an expenditure of 32s. 6d. From these results the grower may conclude that the judicious application of fertiliser for maize production is a good investment, but, as Mr. Blackshaw points out, our experience of manuring for maize is limited, and farmers are not advised to dress a large acreage until they have first determined that their lands respond profitably to the treatment. The articles contributed by Mr. Jack, dealing with "Borers in Native Timber" and the "Spraying of Potatoes," make known the results of careful research over a prolonged period in the subjects in question. A remedy that will preserve our native timbers against the devastating attacks of borers is of great value to the country at large, and the results obtained by Mr. Jack indicate that a practical treatment has been demonstrated.

A School of Agriculture for Southern Rhodesia.

By ERIC A. NOBBS, Ph.D., B.Sc., Director of Agriculture.

To-day Rhodesia rejoices in an excellent system of primary education owing to an enlightened and active policy of State aid and to the generosity of the late Mr. Alfred Beit. It has to be recognised, however, that in these days of advanced civilisation and specialisation after general education is finished, there is yet much to be learnt before equipment for the battle of life is complete. Technical education is, therefore, the natural complement, the essential corollary of our national educational system. Formerly trades and professions were learnt in the course of long and arduous apprenticeships. This has given place, in large measure, to training in technical schools or modern universities, and this principle is now as generally accepted as regards agriculture as for any other scientific profession. It is no longer popular to decry agriculture, and the time is past for saying that the fool of the family can be a farmer. As now understood, agriculture ranks as a science, a sphere of knowledge combining both theory and practice, the application of which is both a skilled profession and an art. No country where farmers constitute an important element of the population is without its means of agricultural instruction adapted to the local conditions and requirements, and different forms of agricultural schools and colleges are now to be found in every progressive rural community. Such a position Rhodesia claims, and not without reason, and it is obvious, and has for some years past been a publicly expressed wish, that facilities for instruction in

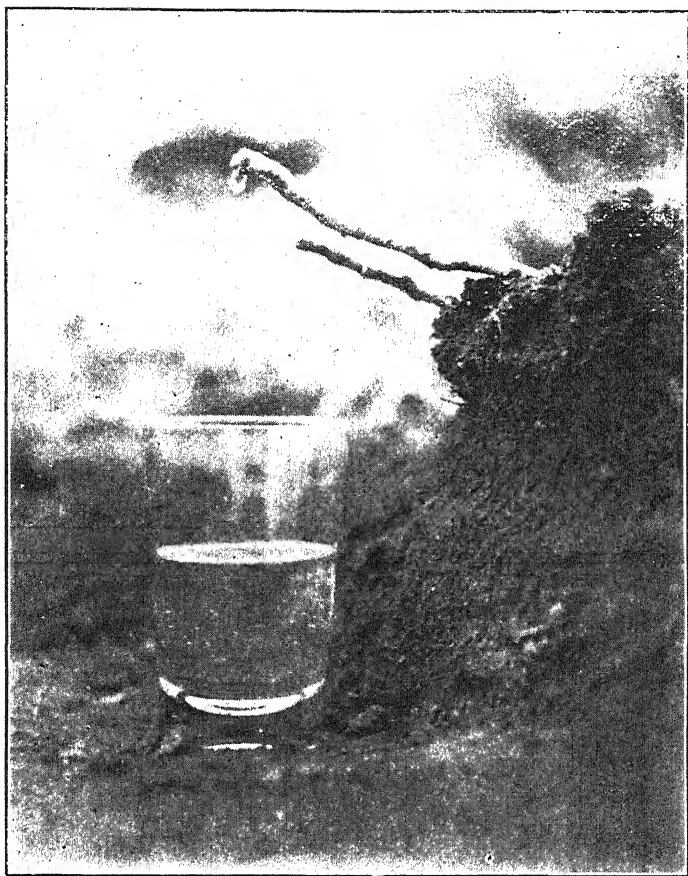
agriculture should be provided, so that the general principles may be learnt in their application to actual local circumstances, and that our future farmers may be taught to deal with the problems peculiar to Rhodesia on the spot in a way which no education in foreign countries can pretend to achieve.

The matter was first brought to the notice of the Agricultural Union at its Congress in 1909, and representations on the subject have been repeatedly made by farmers' associations and by leading public men on various occasions. It can fairly be assumed that there is a general agreement as to the desirability of providing such instruction and no word of opposition to so meritorious a proposal. In opening the recent Farmers' Congress at Salisbury, his Honour the Administrator referred to the decision of the Government to undertake the establishment of an agricultural college as soon as circumstances permitted. The President of the Congress, Mr. R. A. Fletcher, in his address, welcomed the proposal, and emphasised the desirability of training a boy in the environment in which he was going to live, and pointed out that the conditions of Rhodesia differed in many respects to the rest of South Africa. At a later stage, and on the initiative of Mr. Jarvis, the Congress tendered its thanks to the Government in connection with the establishment of an agricultural college.

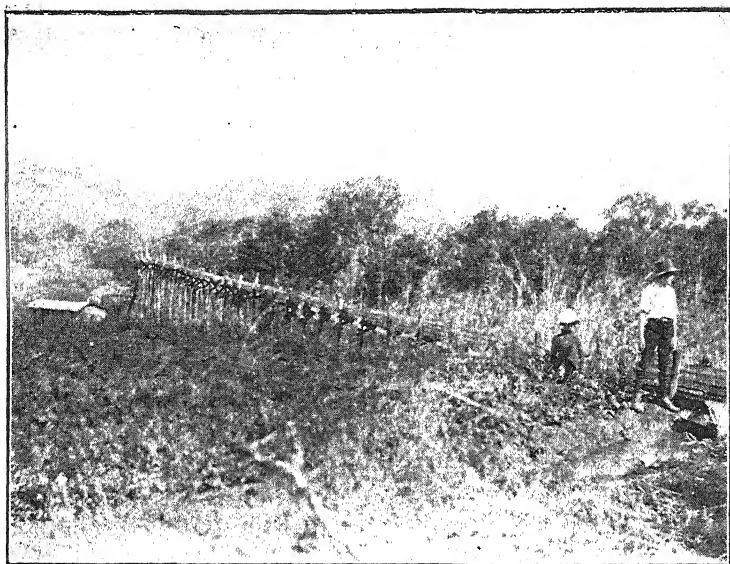
It was in the knowledge of this generally expressed wish and recognising the desirability of promoting agricultural education, that the Board of the British South Africa Company came forward with an offer of material assistance for the inauguration of the projected school of agriculture. The subject was referred to in the following terms in the Administrator's speech at the opening of the Legislative Council:—

“The important position which the farming industry occupies in this Territory has led the Company to the conclusion that it is most desirable to provide, at an early date, facilities for giving a sound agricultural education to the sons of settlers, and to others who may desire to become settlers in the country.

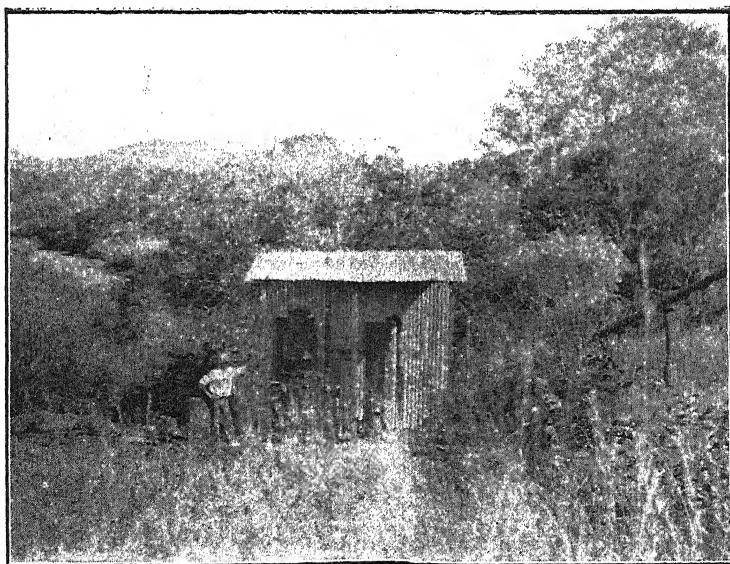
“The Company is prepared to advance the funds required for establishing and equipping an institution for this purpose on certain conditions which will be submitted



Mr. C. B. Winder, who sent the above photograph of a pumpkin stalk after the rest of the plant had been cut away two days previously, states that the water in the tumbler shews one hour's flow. This will give an idea of the enormous amount of water used by the plant in the course of growth, all drawn from the soil. The water thus absorbed by the roots is charged with food material dissolved from the soil. This food material is retained by the plant and is used in the building of its tissues, the water eventually passing away very largely by means of the leaves. Mr. Winder not inappropriately entitles the photograph "The Pumpkin Pumps."



Irrigation scheme at Messrs. Ward and Hofmeyr's farm,
Woodbrook, Bindura.



Pumping Station at Woodbrook.

for your approval, and, further, it will contribute from its private funds an annual sum, for a period to be fixed, towards meeting the deficiency between expenditure and income which may be expected to arise in the earlier years of the existence of the school.

“It is intended to combine with the school a stud farm for the purpose of breeding pure stock for disposal to farmers, and a favourable opportunity having recently offered itself, a commencement in this direction has been made.

“Experimental work of all classes will also be carried out upon the farm on which it is proposed to establish the school.”

The offer of the Company was subsequently explained at length by the Treasurer, and consisted of a proposal to provide the necessary funds for capital expenditure to the amount of £30,000, as a loan at 5 per cent. interest, repayable by instalments over a series of years, and in addition, out of its private funds, to meet deficiencies in working expenses during the first eight years, involving a further total amount of £30,000, thus relieving the public revenue from any serious call on its resources until such time as the benefits to be derived from the institution were being felt.

The scheme met with a cordial reception in principle, but it was felt by a majority of the elected members that in view of the unfortunate financial stringency at the moment, it was not advisable to incur what must necessarily be a considerable capital expenditure, although a loan on similar terms was assented to for certain public buildings in Bulawayo. This attitude, whilst unquestionably explicable on grounds of caution, is to be regretted for various reasons. Agriculture is progressing rapidly in Rhodesia, and the need, publicly recognised four years ago, is now greater than ever. It takes time to build and equip an institution of this kind, and to collect a competent staff, and a longer time to put students through a course of instruction and pass them out ready to enter upon the business of farming. It is a recognised characteristic of the state of agriculture in Rhodesia at present, and due to the circumstances of our history, that a large proportion of Rhodesian farmers have taken up farming without having been brought

up to it, and owing to the newness of the country have had to acquire their knowledge in the most expensive school—that of bitter experience. It is to obviate these drawbacks in the future, to teach our own rising generation, and to attract that rural population which is on all hands recognised to be our chief need, that a school of agriculture is urgently wanted. The refusal, or rather the postponement, by the Council of the necessary funds, for such it really was, is the more unfortunate in view of the generous offers of financial assistance from the Board indicated above.

There is, however, no cause to assume that the scheme is to be abandoned or even seriously delayed. The matter is undoubtedly of prime importance—indeed of urgency—and justifies special measures to ensure its early realisation. Until means, however, can be found to put the project into force we must do what we can to meet the needs of the moment provisionally by providing brief courses of instruction through the medium of the Department of Agriculture at Salisbury, and by giving individual lectures at farmers' meetings wherever these can be arranged—an inadequate substitute for what is required.

It may be well to make as public as possible, and indicate to all interested, the exact nature and scope of these proposals. There is nothing new in the idea of an agricultural college, and in suggesting the establishment of such a school we are but following the recognised policy of other countries, and one already highly developed in Canada, the Commonwealth of Australia, and the Union of South Africa; not to mention the very complete and far-reaching systems in the United States of America, Great Britain, and on the Continent of Europe. In devising a scheme for Rhodesia, it has been possible largely to draw upon foreign experience, and the proposals cannot, therefore, be regarded in any way as conjectural, experimental, or even novel. At the same time, to meet our conditions, certain adaptations are called for, and these, it may be stated, generally lie along the line of emphasising the practical side of the instruction offered, aiming not at producing experts, but endeavouring to train young men to be farmers. By this it is not meant that manual work is to occupy chief attention, but that prominence is to be given to the economics of farming, to field operations, farm management.,

and the financial aspect, rather than to theoretical learning. Of course, the scientific principles which form the basis of all successful practice have to be learnt and understood before their application to farm routine can be grasped. In Rhodesia as it is to-day, the chief need is a thorough training to enable a young man to tackle successfully farm life remote from the conveniences of older and densely peopled countries, where every facility exists for speedy marketing of produce, for repairs by wheelwrights, blacksmiths and carpenters, for prompt purchase of spare parts to replace breakages, and for carrying out permanent improvements, building, fencing, and the like by assiduous contractors. The Rhodesian farmer must be largely independent of such aids, and should also have a working knowledge of a variety of subjects, such as veterinary medicine, first aid, elementary surveying, butchery, and the like. Familiarity with every aspect of farming is essential, for the stock-breeder must be to some extent an arable farmer, and *vice versa*, and so on in all branches. It must not, however, be expected that a school of agriculture can turn out ready-made farmers, guaranteed to be successful. That is the aim and the responsibility of the student himself, and no doubt the education afforded leads all to that end, but business acumen and farming aptitude can only be developed by actual practice. Again, it is not possible in such an institution to give opportunity for experience in managing and directing the native labourer. In many farm operations, such as ploughing, driving oxen, and even milking cows and hewing mealies, the experienced labourer is obviously more skilled than the white tyro, and until the latter has learnt to do all these things himself, he is not able to manage, direct, or supervise natives, or to gauge whether they are doing their work well or ill. Until he himself knows what constitutes a day's work, he is unable to know whether his boys are diligent or idle.

To meet the requirements of those likely to avail themselves of the facilities offered it would be necessary to arrange two classes of instruction: first, a comprehensive course extending over two years, including four terms separated by a recess of about a month, half of which time would be devoted to lectures and half to field work; second, a series of short, complete courses on special subjects, such as dairying, stock breeding, veterinary science, horticulture, poultry farming,

and the management of particular crops for those who were unable to devote time to the full curriculum. Brief, general courses for farmers, schoolmasters, and others might also be arranged. Whilst the two years' course of tuition is adopted as the fixed standard, and although incomplete education is to be discouraged, yet it must be recognised that, at any rate in the early stages, a considerable latitude has to be allowed, as one object of the school must certainly be to assist the young settler from other countries to take up farming here and to give these newcomers a convenient means of gaining local experience before taking up land for themselves. At first the aim must be to benefit all who desire it, whether they can attend a complete course or not, whilst giving preference to those who wish to take the fullest advantage of the means of instruction afforded. Preference would be given to the Rhodesian-born student, perhaps by taking him on at a lower scale of fees than that charged to students from outside the Territory. The curriculum proposed is not dissimilar to that of the existing schools in the Union and elsewhere, but it is modified to suit local conditions, and is formulated on less ambitious lines for the present.

Owing to the variety of the subjects which are comprised in the study of agriculture, it is not possible to conduct such a college without a fairly numerous staff. In a fully equipped college, often the numbers range from 12 to 14 lecturers, with several instructors in handicrafts and foremen in charge of different sections of farm work. Beginning here as it is anticipated we must do on a humble scale, but in the expectation of rapid expansion, it is considered that a staff consisting of a principal, three or four lecturers, a secretary, matron, and three foremen instructors and a farm overseer will suffice, although no doubt in certain cases it will be necessary to combine under one individual various subjects, which, if circumstances admitted, it would be preferable to separate. The principal, besides his administrative functions, would be a lecturer on agriculture, taking part of that wide subject, whilst the other teachers would deal respectively with other aspects of agriculture and with the allied sciences, chemistry, physics, geology, botany, zoology, physiology, bacteriology, and kindred subjects, so far as they relate to agriculture, whilst veterinary science would be taught by a qualified veterinary

surgeon, who would also do the duties of his profession in the district. Until a complete resident staff could be supplied, assistance would be sought from the technical officers of the Department of Agriculture, but it must always be remembered that the duty of these officers is research and help to our working farmers, and that instruction in first principles is not their proper avocation.

Following on experience gained elsewhere, it is proposed to establish a college or school of agriculture on a farm in the centre of a representative agricultural district typical of a large portion of the country, and situated sufficiently near the capital to be conveniently accessible, but far enough to be beyond the distractions of the town. An exceedingly favourable site, satisfying these somewhat difficult conditions in an exceptional degree, is to be found on the Government farm, Gwebi, 18 miles from Salisbury, on the Lomagundi line. The selection of this farm has this further advantage that for some years past, as means have allowed, this place has been developed as an experiment station, for which purpose it has been found to be admirably suited. This side of the work would be an enormous advantage to the school, and would in turn benefit from the presence of the scientific staff resident there. In a lesser degree the farm is serving the purpose of a stud farm, a branch of work which might advantageously be augmented in connection with the school of agriculture. These uses to which the Gwebi farm is now put, harmonise entirely with the further purpose which it is proposed it should now serve. In fact, many advantages, including material economy, accrue from combining with the school of agriculture a stud farm and an experiment station. Such a triple scheme is in accordance with the practice of other countries where agricultural colleges have come to be regarded as centres of instruction and research, and as such of assistance to the established farmers within reach of its influence, as well as to the students within its precincts.

In preparing plans of the necessary farm buildings, classrooms, laboratories, dormitories, and so forth, recourse has been had to numerous existing schools as models. The latest ideas have been borrowed from Australia, where at present great expansion is taking place in this direction, and where

numerous new buildings of the kind are in progress or have lately been completed, comprising all the improvements which have been suggested during the many years since the first college was opened at Dookie, in Victoria, in 1884. The respective Departments of Agriculture of the States of the Commonwealth have most courteously assisted this Administration with plans, photographs and specifications from which to frame our designs. South African experience in this connection has also been utilised, although in several of the southern colleges, at the outset, there were old buildings already in existence which had to be adapted for their new uses; a drawback which we are fortunately not faced with here. The plans have been prepared with a strict view to economy of construction, and with provision for extension at a later date. At the same time, adequate accommodation for the purposes in view implies considerable structural works, and the importance of the scheme warrants buildings which, whilst not ostentatious, are yet in keeping with the dignity and magnitude of the institution.

The plans and estimates for these requirements have been prepared, and without, at this stage, going into detail, it may be said that an inclusive capital outlay of about £30,000 is involved; a figure which, high as it may at first sight appear, is moderate compared with similar institutions elsewhere in cheaper countries, and has been framed with a view to strict economy and the absence of superfluous embellishments. This first approximation of the cost includes buildings, equipment of the farm, fencing and live stock. The most serious item is the building of class-rooms, laboratories, dining hall, quarters for staff and students, necessary farm buildings, offices, water supply, and so forth. In the first instance, accommodation would be provided for thirty pupils, but ultimately the full complement would be between sixty and seventy. In this general estimate is also included such additions in equipment as may be necessary to enable the farm to meet the new requirements and the prime cost of the necessary stud stock.

Towards the cost of maintenance it is anticipated that a considerable revenue will be derived from the sale of pure-bred animals as well as from crops, whilst produce supplied to the residents on the farm must be credited to it for revenue

purposes. Obviously the farm cannot itself support its entire resident population. The fees, whilst made as low as possible, will also aggregate to a considerable sum. The school must, as do all such institutions, look for support to the public revenue, supplemented perhaps from funds derived from bequests and endowments. In America, and in Australia in the case of the famous Dookie College in Victoria, endowments take the form of large grants of land set apart for the purpose.

Against the annual charge on the revenues of the country is to be set the value of an annual output of, say, thirty scientifically educated farmers distributed over Rhodesia to establish homes and to grapple with the problems of the country, not only helping themselves, but in so doing also serving as a leaven to influence and benefit their neighbours. As time goes on this trained body of men, annually added to, must exert a powerful influence on our national wealth and development. In addition to this, the benefits of the short courses of instruction will be felt far and wide, whilst the experimental research and the supply of stud stock bred on the farm and pedigree seed grown are factors not to be overlooked in assessing the benefits of the scheme.

It is, of course, impossible to gauge or express in terms of the coinage the advantages thus to be conferred on this and subsequent generations or to assess the return on such an investment. Rather the establishment of an agricultural college is to be regarded as a national duty, and the results as an inestimable boon to posterity.

Extracts from the Report of the Chief Veterinary Surgeon for the year 1912.

AFRICAN COAST FEVER.—As for several years past, our efforts have been directed chiefly to this disease, and it is satisfactory to be able to state that we succeeded in restricting its spread, and in making good progress towards its eradication. During the year 5 fresh outbreaks occurred, compared with 8 the previous year and 18 in 1910; including these, the total number of areas on which the disease occurred was 10. The total mortality, which includes animals in infected herds destroyed on shewing a rise of temperature, was 505; of these, 409 occurred at one centre, leaving 96 deaths spread over the other 9 centres of infection.

In my last report I expressed the opinion that the cattle owner who fenced his farm and dipped his cattle regularly need not fear coast fever; this view has been amply borne out during the year, as will be seen from the appended schedule of the progress of the disease at various centres where three-day dipping was practised. Confidence in dipping as a preventive measure against coast fever is shewn by the large number of tanks now in use all over the country. Apart, however, from coast fever, cattle owners are beginning to realise that they can make no better investment on a farm than a dipping tank. In some cases, not only are the cattle dipped, but every head of domestic stock on the farm, with the result that growth is not retarded and better condition and health generally are maintained. Another result of regular dipping is the almost entire disappearance of liver disease, scour, etc., in calves. This is especially marked in dairy herds, in which such complaints formerly caused a mortality of up to 90 per cent.

During the early part of the year it was decided to enforce regular dipping in a large area around the infected centres in the Bubi, Bulawayo, Umzingwane and Matobo districts. It was several months, however, before tanks could be erected and arrangements made for all cattle within the defined area. The severe drought also interfered with the operations. At some tanks water was unobtainable; at others cattle were too poor to be immersed once or twice a week, as required. The difficulties are, however, disappearing, and we hope at an early date to have upwards of 30,000 head of cattle regularly dipped in or around the infected centres.

District.	Area.	Mortality.	Date of last case of African Coast Fever.
Umtali ...	Umtali Commonage	2	11th March
Salisbury ...	Salisbury ..	2	12th May
Bulawayo ...	Bulawayo ..	65	24th June
" ...	Portion of Alnwick Estate	3	18th September
Umzingwane ...	Farm Spitzkop	1	31st January
" ...	West Paddock, Umzing- wane River	1	15th February
" ...	North Paddock, Umzing- wane River	4	29th ..
Matobo ...	Farm Inyorka	8	12th ..
" ...	" Collaton	409	31st October
Bubi ...	" Induba	10	14th May
Total		505	

CONTAGIOUS PLEURO-PNEUMONIA (LUNGSICKNESS).—An outbreak of this disease occurred in a herd of cattle on the farm Summerton, a few miles from Plumtree Station and the southern border. The animal affected was an aged cow which had been on the farm for over five years; *post-mortem* examination disclosed undoubted lesions of lungsickness of several weeks' standing. The herd was placed in quarantine and all movement of cattle in the district suspended. No further cases occurred, and the restrictions were removed after three months. It has not been possible to trace the origin of the infection which caused this outbreak. The last recorded case of lungsickness in the whole Territory occurred in Salisbury district in 1904, and no case is known to have occurred in Plumtree district for at least twelve years. It can, therefore,

safely be assumed that the disease did not originate in Southern Rhodesia. In the territories which adjoin us on the west, viz., Bechuanaland Protectorate and the Tati Concession, lung-sickness infection has existed for many years past, and within the last three years several outbreaks occurred close to the border, and we have been apprehensive of its re-introduction, especially as cattle are frequently smuggled across the border into the Plumtree district. There can be little doubt, therefore, that the disease was introduced from across the border, but when and under what circumstances it is difficult to suggest. When the outbreak occurred it was considered more than likely that another centre or centres of infection would be found in the district, but fortunately this expectation was not realised.

ANTHRAX.—Two sporadic outbreaks of anthrax occurred during the year—one amongst pigs on the Ardbennie plots, adjoining Salisbury Commonage; the other amongst cattle on the farm Umganin, about eight miles from Bulawayo. The infected areas were placed in quarantine and all carcasses burned or buried in lime. The mortality in the former case was 14 pigs and 1 donkey; in the latter, 6 head of cattle. There is no record of the previous existence of anthrax in Southern Rhodesia, except an outbreak at the old rinderpest inoculation station at Ramaquabane in 1898. It is quite possible, however, that cases have occurred and have not been diagnosed or reported. It has been demonstrated at various centres through the whole of Africa, and it is scarcely likely that such a heavily stocked country as this formerly was would escape infection until now. It is well known that the infecting material of anthrax may persist outside the animal body for a very long period by means of spores, and its apparent non-existence for so many years may have been the result of the destruction of practically all the cattle in the country by rinderpest in 1896 and the subsequent ravages of coast fever. As a rule anthrax infection is not general; it exists more or less in patches, and naturally the fewer cattle there are in any given area, the more remote the probability of its manifesting its presence. With the rapid increase in the number of cattle it is quite possible that we shall have occasional outbreaks of this disease in districts hitherto regarded as free from it. The possible introduction of the disease through the medium of contaminated

foodstuffs should not be overlooked; but, as cattle and pig owners rarely, if ever, feed with imported material, this contingency may be put aside. Had the disease occurred amongst horses or mules, some such source might have been suspected. Bone manure is also a possible medium of infection, but in neither of the areas on which the disease occurred has it ever been used.

BOVINE PLASMOSES.—Under this heading are included Piroplasmosis or redwater, and Anaplasmosis or gallsickness. Both are enzootic throughout the greater part of Southern Rhodesia. Calves contract the infection of both diseases shortly after birth, and in most cases recover without any apparent symptoms of illness. The immunity conferred by an attack of redwater is of a passive character, and gradually disappears unless the animals are subject to constant re-infection by ticks; in other words, constant tick infestation is necessary to establish the immunity or tolerance conferred by the primary attack. It is evident, therefore, that the destruction of ticks by dipping or other process will result in the disappearance of the immunity. This result has been observed recently at various centres where dipping has been regularly carried out for coast fever purposes. The mortality from redwater not complicated with other affections is not very high. The affected animals respond satisfactorily to treatment, especially to the subcutaneous or intravenous injection of a solution of trypan blue. Unfortunately, however, an attack of redwater is in the majority of cases followed at a short interval by one of gallsickness. This disease, exercising its full force on animals whose vitality has been lowered by redwater infection, causes a very heavy mortality, and many of the animals which survive are left in such a debilitated, anæmic condition that complete restoration to health may take one or two seasons. Amongst locally bred stock the rate of mortality from redwater and gallsickness has undoubtedly increased during the last two or three years, more especially amongst calves the pure or cross progeny of exotic breeds. In addition to the contributory causes already indicated, viz., dipping and the greater susceptibility of the finer breeds, there is some reason for stating that the type of gallsickness has increased in virulence. That this is not entirely because of increased susceptibility would appear from the following

observation. During three successive winters young stock from a certain portion of Vryburg district were brought to a farm in Matabeleland. The first season there was practically no mortality; the second season about 10 per cent., and the third about 30 per cent. died from redwater and gallsickness. Amongst cattle imported from the south the rate of mortality has also increased, due chiefly to the extensive practice of dipping as a preventive of coast fever. But apart from this it has been shewn experimentally by the Government Veterinary Bacteriologist that gallsickness virus obtained from Pretoria does not render an animal completely immune against natural infection in Rhodesia, the obvious conclusion being that the type of disease which exists here is more virulent than that which exists in the Union. The subject of inoculation as a means of protecting imported susceptible animals against natural infection is comprehensively dealt with by the Government Veterinary Bacteriologist. He clearly shews that to establish immunity in susceptible imported stock it is necessary to use a local strain of virus. The unfortunate results obtained by him in inoculating a consignment of cattle imported from England during the year emphasises the conclusions previously arrived at in regard to the age and general type of animal most likely to withstand the severe process of protective treatment. The increasing mortality from Anaplasmosis, especially amongst calves of the better breeds, is a serious drawback to the cattle industry, and requires further experimental investigation on sero-therapeutic lines.

ANAPLASMOSIS OF SHEEP.—Early in the year the Government Veterinary Bacteriologist discovered the existence of Anaplasmosis in sheep, and extended investigation demonstrated its existence in various districts throughout the Territory. Locally the disease is known as "bottle jaw," and was generally regarded as being due to various intestinal parasites. In some cases where animals died from acute attacks it was described by the owners as "gallsickness." The symptoms observed are those of anæmia and cachexia, and are scarcely distinguishable from those set up by intestinal worms. A common symptom is œdema of the submaxillary space, hence the term "bottle jaw." The infection is probably transmitted by ticks; if so, regular dipping would appear to be a suitable preventive measure. Various owners have been

advised accordingly, but as yet it is not possible to express any opinion as to its value. Experimental investigation of this, and other diseases of sheep, is urgently required.

TRYPANOSOMIASIS.—Although tsetse fly exist to a considerable extent in the Sebungwe, Lomagundi and Hartley districts, the trypanosomal diseases transmitted by them to the domestic animals, generally termed “fly struck” or “fly disease,” are not of great economic importance from the veterinary point of view, except in so far as it is impossible to farm with stock in the more grossly infested areas. The only mortality of any consequence reported during the year was from the Sebungwe district, where 20 head of native cattle succumbed. In Hartley district fly are still to be found in small numbers in the farming and mining areas, but only a few deaths of cattle were reported. No cases were reported amongst horses, mules, or donkeys. The treatment of affected cattle by the Government Veterinary Bacteriologist was continued with considerable success. In one instance, 20 animals were submitted. All of these shewed clinical symptoms, and 11 shewed trypanosomes in the peripheral blood. Two were retained as control animals. Some received one injection only; others a second treatment after an interval of two days. The trypanosomes disappeared from the peripheral blood soon after treatment, and all the treated animals improved greatly in condition and are still alive. It is not considered desirable to make public at the present stage the nature of the treatment, because injudicious administration might result in unfavourable results and the discredit of the method. As occasion offers, further observations will be made with a view to confirming the satisfactory results already obtained. In the early part of the year it was reported by one of the Commissions engaged on sleeping sickness work in Central Africa that it was considered possible that cattle could harbour the trypanosome which causes sleeping sickness in man. We were compelled, therefore, to suspend the importation of cattle from North-Eastern Rhodesia *via* Feira, as it is now practically impossible to avoid fly areas *en route* to Feira. A large herd of cattle was detained at Feira, and on inspection a certain number were found to be affected with Trypanosomiasis. Several sheep and dogs were inoculated from them and forwarded to the Veterinary Laboratory, Salisbury, for further

observation and experiments. The results obtained are given in the report of the Government Veterinary Bacteriologist. It may be stated shortly here that no trypanosomes of the sleeping sickness type were found. It was also found necessary to suspend the importation of cattle from North-Western Rhodesia because of the existence of disease in the district of Shesheke, and commonly termed "Shesheke sickness of cattle." From information to hand, this disease appears to be a fatal form of Trypanosomiasis which occurs in an area free from tsetse fly, and investigations are now being conducted to determine, if possible, the transmitting agent. Should it be found that biting flies other than tsetse are capable of transmitting the disease, the danger of its introduction into this Territory must be seriously considered.

TESTING OF EQUINES.—It is satisfactory to be able to report that no case of glanders occurred during the year. The practice of testing all horses, mules and donkeys entering the Territory, which was instituted in 1899 and since consistently carried out, has been of the greatest protection from any serious invasion of the worst and most dangerous of the scourges which affect solipeds. The following animals were tested with mallein on entry:—Horses, 848; mules, 986; donkeys, 2,187. Two horses re-acted and were destroyed. *Post-mortem* examination confirmed the existence of glanders.

EPHEMERAL FEVER. THREE DAYS SICKNESS OF CATTLE.—In January this disease re-appeared in the districts of Salisbury, Marandellas, Hartley, Enkeldoorn, Lomagundi, Wankies, Makoni, and Inyanga. Although large numbers of cattle were affected the mortality was practically nil.

RABIES.—Outbreaks of Rabies occurred in the Victoria, Ndanga, Chibi, Gutu, Chilimanzi, Charter, Hartley, and Salisbury districts. The disease is apparently enzootic in the Victoria and adjoining native districts, and the regulations which provide for the chaining up or enclosure of all dogs for a period of not less than six weeks do not appear to be sufficient to eradicate it. Although six weeks is the minimum period prescribed by the regulations, the infected areas or districts are, as a rule, proclaimed for a period of three months, which is, if considered necessary, extended. In the large native

districts, which contain enormous numbers of dogs, it is a difficult matter to ensure that strict observance of the regulations which is essential to the control of the disease. Although positive evidence is wanting, there is good reason for believing that the disease exists amongst the wild carnivora; if so, its eradication amongst the domestic animals is practically impossible.

The provisions of the Dog Tax Ordinance which is now in force will, by reducing the number of dogs in the country, be of the greatest assistance in reducing the incidence of the disease, and also of tracing the source of infection in fresh outbreaks.

HORSE SICKNESS.—The horse-sickness season of 1912 was the lightest on record. No statistics are available, but not more than a dozen deaths were reported to the Department.

TUBERCULOSIS.—Tuberculosis is unknown amongst indigenous cattle, and only one case is recorded amongst cattle imported from the South, viz., a Cape Peninsula heifer in 1908. In order to prevent its introduction by means of cattle from overseas, all animals are tested with Tuberculin on arrival. Out of 115 head imported from England and America during the year, nine head re-acted to the test and were destroyed, *post mortem* examination in each case disclosing lesions of Tuberculosis. Of the nine animals destroyed, five belonged to a consignment of eight bulls imported from England by one of the large ranching companies. These animals were tested with Tuberculin in England, but the foot and mouth disease regulations prevented their shipment for several months. Unfortunately the precaution of re-testing them immediately before shipment was not taken, with the result above stated.

IMPORTATION OF STOCK.—From Great Britain: 54 cows and heifers; 61 bulls. From United States of America: 1 bull. From Cape and Orange Free State: 3,810 heifers; 244 bulls. From Portuguese East Africa: 229 head of slaughter stock. From Northern Rhodesia: 675 head of mixed cattle; horses, 848; mules, 986; donkeys, 2,197; pigs, 194; sheep and goats, 63,578; ostriches, 72.

RINDERPEST.—For several years Rinderpest has existed in the Uganda and East African Protectorates. During the year it appeared at several centres in German East Africa. From information at our disposal, it appears that the disease is of a less virulent type, and is not spreading so rapidly as during the former visitation; notwithstanding this, the possibility of its gradually progressing southward until it reaches this territory must not be disregarded. Arrangements are being made for a supply of serum, and a conference of the principal veterinary officers of the various States and Territories concerned will meet shortly at Bulawayo to consider the best means of preventing its introduction into the areas of their respective administrations, and for controlling it should it be unfortunately introduced.

VETERINARY LABORATORY.—Apart from the routine work undertaken at the Laboratory, such as the diagnosis of African Coast Fever, Rabies, etc., a considerable amount of research work was performed during the year, chiefly in regard to Horse-sickness, Bovine Plasmoses, and Trypanosomiasis. These and other subjects are fully discussed in the report of the Government Veterinary Bacteriologist, and it is unnecessary to refer at length to them here. The progress made in Horse-sickness investigations is most satisfactory, and hold out great hope of the ultimate discovery of a means of combating this scourge, which in most years exacts such a heavy toll on horses and mules of this country. The importance of the work on Piroplasmosis and Anaplasmosis (Redwater and Gallsickness) cannot be over-estimated, more especially in view of the increasing importation of pure-bred stock, which are highly susceptible to these diseases, and from which the mortality amongst such animals when exposed to natural infection is very heavy. Although much has been done, more remains to be done, and it is desirable to extend the work of this branch to other diseases, such as ophthalmic anaplasmosis of sheep, verminous affections of sheep, etc.

Extracts from the Report of the Veterinary Bacteriologist for the year 1912.

EXAMINATION OF PREPARATIONS.—This branch of the work has considerably increased, the number of blood smears and pathological specimens sent for diagnosis by members of the Veterinary Staff and laymen being almost double that of the previous year.

RABIES.—The heads of animals suspected to have died from rabies have been sent to the laboratory from Victoria, Gatooma, Battlefields, Gwelo, Inyati, Makwiro and Salisbury district.

BOVINE PLASMOSIS.—Experiments were conducted to determine whether the redwater of Northern Rhodesia was identical with that of Southern Rhodesia, two young bulls being received from the Livingstone district for the purpose. The results shew a close relationship between the two viruses, which is in accordance with practical observations in the field. The Pretoria virus having been found not to confer complete immunity to imported cattle exposed to natural infection in Southern Rhodesia, it was considered desirable again to make use of an attenuated local virus, previously employed at the laboratory with very fair results. It was considered better that the animals should suffer from the diseases whilst under veterinary supervision than unexpectedly after distribution, when in all probability at a distance from professional assistance. During the year 1912, 77 animals from the Southern Colonies and 68 from Great Britain were successfully immunised. Twenty-five home-bred animals died, but their owners had been previously warned that such stock was unsuit-

able for inoculation on account of age, soft condition, pregnancy or in-breeding; it having been found that the age limit of safety is under 18 months, that adipose tissue is a very serious disadvantage, and that pregnancy constitutes a grave danger. In-breeding for type or show purposes undoubtedly reduces vigour and vitality; rough hardy pastured animals having proved themselves the most suitable subjects for inoculation. Disappointing results have attended the use of trypan-blue, which, while controlling redwater, appears to produce a condition unfavourable to recovery from the Anaplasmosis which follows. It is especially harmful in pregnant animals.

ANAPLASMOSIS OF SHEEP.—Early in the year it was discovered that in many districts sheep, thought to be suffering from verminous diseases, were affected with Anaplasmosis. Some experiments were conducted to study the course of the disease in sheep.

HORSE-SICKNESS.—During the past year satisfactory progress has been made towards establishing a method of conferring immunity to horses against horse-sickness. Seventeen horses have been supplied for experiments. Two of these have been used as controls and have died, and one foal which had never been inoculated died from an injury causing internal hæmorrhage. Of the balance, 7 have been successfully immunised. Three of these, and two others inoculated in 1911, were handed over to the Chief Veterinary Surgeon to be tested as to their immunity. A large dose of Dr. Theiler's virus, used in the inoculation of mules, but without the controlling serum, was inoculated subcutaneously into them, and, at the same time, into a control horse, which died on the eleventh evening, the treated animals remaining unaffected. Thus, in spite of the dangers unavoidably associated with experiments of this sort, 50 per cent. of the subjects have survived. Unfortunately only a small quantity of suitable material has been obtained, and much work remains to be done in procuring and standardising a supply, so that inoculation can be applied on a large scale.

TRYPANOSOMIASIS.—An investigation was made by the Medical Department regarding trypanosomiasis in Sebungwe.

Material obtained from sick natives and animals was sent to the Veterinary Laboratory for closer study.

Six rabbits were received, inoculated as follows:—

1. *Human Strain*.—Two rabbits inoculated with blood from a native at Siandola's Kraal. Carrier to Dr. Stohr.
2. *Dog Strain*.—Two rabbits inoculated from Native Commissioner's dog, which had been with its master through the "fly" area and has visited the Busi Valley.
3. *Goat Strain*.—Two rabbits inoculated from a sick goat at Siandola's Kraal, on the Busi River.

The two rabbits inoculated with human blood, one rabbit inoculated with blood from the dog, and one rabbit inoculated with blood from the goat, became infected with trypanosomes, which in morphology, motility and animal reactions appeared to be identical. The parasite met with in each of them belonged to the *nagana* type, being polymorphic; long and slender free flagellated forms, short and stumpy, and intermediate forms were recognised, but no sharp division could be drawn between one type and the next, the one merging into the other. Clinical symptoms in rabbits and dogs were those generally met with in trypanosomiasis. Sheep developed some œdema of the face, but this was not as well marked as in those inoculated with the first strain of *T. rhodesiense*.

The disease ran its course as follows:—

Animal.	Strain.	Period of Incubation.	Duration of Disease.
Dog	Human	4 days	34 days
"	Dog	5 "	22 "
"	Goat	8 "	26 "
Sheep	Human	4 "	49 "
"	Dog	8 "	Still alive after 84 days
"	Goat	8 "	" "
Rabbits	Human	8 "	13 days
"	Dog	8 "	19 "
"	Goat	8 "	27 "

In one rabbit inoculated with blood from the infected dog, and in one of the two rabbits inoculated with blood from the infected sheep, a less acute disease was produced, and a different type of trypanosome developed. This was very surprising, since in each case two rabbits were inoculated with similar blood taken at the same time and in the same manner. That is to say, blood was taken from the heart of the Native Commissioner's dog just dead, and was then and there inoculated into two rabbits, one rabbit developing an acute disease due to the polymorphic variety of trypanosome, the other developing the chronic form of the disease caused by the small form of *Trypanosome pecorum* type. In the same way, the ear of the sick goat having been cut, blood was drawn up into a syringe, part being injected into one rabbit and part into the other. One rabbit developed the acute disease due to the polymorphic trypanosome, the other the chronic form of the disease, the small trypanosome of *pecorum* type only being present. It is possible that the dog and goat were suffering from a mixed infection, but it is difficult to understand why both rabbits in each instance did not react alike. Sub-inoculations were made from these rabbits. A rabbit and a newly born guinea pig resisted repeated inoculations with the dog strain. A rabbit and a goat, however, became infected when inoculated with the goat strain. Experiments shewed that infection with the small trypanosome conveyed no resistance against the polymorphic variety, but rather suggested that animals so infected more readily succumbed when inoculated with *nanana* type.

When encamped in the Sebungwe "fly" area, Dr. Stohr succeeded in finding some 30 pupæ of *Glossina morsitans*. These were sent to the Entomological Department, and 19 flies were hatched out, which were handed over for transmission experiments. Endeavours were made to transmit the disease by mechanical and by cyclical infection. Only one positive result was obtained, and this with two flies which were allowed to partly engorge on an infected rabbit (human strain) and to finish their feed on a clean rabbit. These two flies had four interrupted feeds on four consecutive days, but the rabbit became infected on the twenty-second day after the first feed.

All efforts to bring about a late infection (cyclical develop-

ment) failed, but with so few flies to work with, and at the altitude of the laboratory, this is not surprising.

ANIMAL TRYPANOSOMIASIS.—The treatment of fly-struck animals in the Hartley district was continued with considerable success. The method was improved, so that animals treated with two injections, and sometimes only one, have recovered.

A number of cattle (belonging to three herds) *en route* from North-Eastern Rhodesia were detained at Feira for examination, on account of the possibility of domestic animals acting as reservoirs of the human trypanosome. Nine sheep and three dogs were inoculated from them, and were sent to the Veterinary Laboratory. Two dogs became infected, one dying after 28 days, the other after 44 days, of typical trypanosomiasis, due to a parasite of *T. pecorum* type. Trypanosomes of the same description were found in four of the sheep, but the disease set up in them was of a very mild type, and only two animals have died, although all have been exposed to very heavy rains. In none of the animals have trypanosomes of *nagana* type been encountered. In view of the large percentage of buck found by Kinghorn and Yorke to be infected with the so-called *T. rhodesiense* in the Luangwa Valley, this result is somewhat significant.

Dry Season and Droughts in Rhodesia

(CONTINUED.)

By the REV. E. GOETZ, S.J., Director of the Bulawayo
Observatory.

Besides the yearly drought of six months or more, which I have described in my preceding articles, mention ought to be made of the droughts that occur during the rainy season. In meteorological publications a drought is generally considered as a period during which no rain falls; a fall of even one-hundredth of an inch is supposed to break the drought. For agricultural purposes, this way of looking at the matter is evidently misleading. In the following remarks I shall consider as a drought a period of a fortnight without rain, or any longer period with notably insufficient rainfall, as, for instance, 20 or 25 days with less or little more than half an inch, and so on in proportion. We may divide the droughts into three series according to the time of their occurrence at the beginning, middle, or end of the season.

The November droughts are sometimes only a retardation of the rainy season, as in 1905 and 1912. In that case they are felt all over the country with practically the same intensity. In 1912, the rains were late all over Rhodesia, but they started in December in the east, and only in February in the west, but on other occasions when they were late they started practically at the same time everywhere. On other occasions the rains started at the end of October or beginning of November, and were followed by a dry spell. This drought is generally felt all over Rhodesia, but is not always as severe in the east as in the west, as may be seen in the following table of

droughts in five stations selected at varying distances from the coast:—

November-December Droughts, 1899-1907.

Station :	Embandeni	Bulawayo	Gwelo	Salisbury	Melsetter
Miles from Coast :	430	390	320	200	130
	Days.	Days.	Days.	Days.	Days.
November	20	8	17	8	8
Nov.-December ...	41	41	32	25	14
	16	25	29	22	23
	28	7	4	20	12

The drought which falls in the middle of the rainy season about Christmas time is nearly a feature of the Rhodesian climate. Although we are not theoretically in the double rainy season belt, in which there is every year a break in the rains, there is a marked tendency towards such a break in the Rhodesian rainy season. The way in which rainfall returns are usually published, *i.e.*, in monthly totals, hides this fact, as the beginning of December and the end of January are often periods of heavy rains. These, in the returns, compensate for the deficiency that may occur between these periods. But a slight re-arrangement of the months brings out the fact of this shrinkage very clearly. If we sum up the totals from the 10th of November to the 10th of December, and so on to the 10th of February, for the 13 years of Hopefountain, for which complete records exist till 1907, we get the following averages:—

10th Nov.—10th Dec.	10th Dec.—10th Jan.	10th Jan.—10th Feb.
5·31	4·16	6·25

The averages made up in the usual way from monthly totals would give for the same years:—

November	December	January
5·08	5·71	6·42

The latter way of tabulating the rainfall completely hides the diminution in the rainfall in the period extending approximately from the middle of December to the middle of January.

A fuller investigation of this climatic feature shews that it is due to more than a mere shrinkage of the rainfall. Half

the time it is due to a real stoppage of the rains. The following table of December-January droughts in Bulawayo from 1897-1913, and Hopefountain from 1894-1897, leaves no doubt about this fact:—

December-January Droughts in Bulawayo.

Season.	Days of Drought.	Rainfall.	Days of Rain
1894-1895	44	1.09	6
1897-1898	15	0.60	2
1899-1900	25	1.30	1
1902-1903	43	0.30	4
1903-1904	23	0.35	5
1904-1905	21	0.18	1
1905-1906	19	—	—
1906-1907	21	0.33	2
1907-1908	12	0.06	4
1909-1910	20	0.22	6
1910-1911	19	0.39	6
1912-1913	31	0.47	9

With the exception of the season 1899-00, in which a thunderstorm gave a fall of 1.30 inches in the middle of the dry spell, we may say that in every one of the seasons the rain that fell during the periods here tabulated was notably insufficient; in most cases, in fact, it was absolutely useless.

This same drought is also represented in the eastern records, but as a rule it is not so severe. It is generally shorter, and more rain usually falls during the period. In Salisbury, from 1897 to 1907, we have the following droughts:—

December-January Droughts in Salisbury.

Season.	Days of Drought.	Rainfall.	Days of Rain.
1898-1899	19	0.04	1
1902-1903	40	1.05	4
1903-1904	19	0.39	5
1904-1905	18	0.32	2
1905-1906	19	0.53	1
1906-1907	16	0.05	1

On the whole, this shortage of the rains does not seem to have any great effect on crops in the east. The same cannot, however, be said for the west. In the absence of reliable

statistics it is difficult to estimate the damage done to the crops when this occurs. Some farmers told me that a drought in December-January, such as the ones of 1899, 1902, 1904, and 1912, lessens the yield of a mealie field by about one-half. This can easily be credited, for during this period we have intense heat and often continuous sunshine. During the December-January drought of 1912-13, we had in Bulawayo 14 days during which the sunshine recorded registered from 10 to 13 hours of bright sunshine. During intense sunshine plants require a large amount of water, owing to the transpiration of the leaves. The amount of water transpired by mealie plants during ten hours of sunshine is given by some authorities as averaging $14\frac{1}{2}$ tons per acre. This is equivalent to 0.15 of an inch of rain. A period of drought, characterised by intense sunshine and little rain, hastens the ripening of the grain, but delays the flow of the sap and, therefore, the nourishment of the grain, so that the yield of the field is to a great extent diminished. At the Empandeni Mission Station in Matabeleland they had, from 1903-1907, three seasons with shortage of rain around Christmas, and one with a rainfall well distributed throughout December and January. In this last season the mealie crop was from two to three times larger per acre than in the preceding seasons, and yet it was not the best favoured season as far as the rain is concerned. The rainfall in the three first was, from October to the end of March, 20.93 in., 15.71 in., 24.39 in., and for the last 21.03 in.

The droughts which occur towards the end of the rainy season are nearly wholly confined to the western parts of Rhodesia. As a matter of fact, the rains gradually diminish in intensity in the west after January; there may be some years a little increase at the end of February or at the beginning of March. It is only exceptionally that February is a very rainy month. In the east, on the contrary, the maximum intensity of the rainfall is in February. The study of the detailed rainfall records shews a minimum in the middle of February west of Gwelo, corresponding to the maximum fall of the year east of Gwelo. On the coast the maximum is in March.

The following table gives the list of droughts that occurred in the last part of the rainy season from 1899 to 1907 in the five

stations mentioned at the beginning of the article. A dash means that there was no drought at the station:—

Droughts at the End of Rainy Season, 1899-1907.

Station :	Empanzeni.	Bulawayo.	Gwelo.	Salisbury.	Melsetter.
Duration :	days.	days.	days.	days.	days.
January-February	24	23	22	25	25
February	23	21	22	—	10
	32	30	25	10	—
	26	25	24	—	—
February-March ...	34	35	36	36	25
	27	25	25	9	9
	30	35	29	19	10

Considering as a drought a period of 15 days without rain or a longer one without sufficient rain, and as a severe one a period of 25 or more days, we get for the preceding stations, between 1st November and 1st April, from 1899 to 1907, the following number of droughts:—

Station.	Number of Droughts.	Number of Severe Droughts.
Empanzeni	17	9
Bulawayo	14	8
Gwelo	12	6
Salisbury	8	3
Melsetter	4	2

Agricultural Implements.

We have received from the Bechuanaland Trading Association, Ltd., a neat little catalogue, printed locally, of agricultural implements and dairy appliances. Farmers will find this catalogue well worth studying when contemplating purchasing requisites.

Elephant Grass or Napier's Fodder.

(*Pennisetum purpureum.*)

By J. A. T. WALTERS, B.A., Assistant Agriculturist.

In the February issue of the *Rhodesia Agricultural Journal*, there appeared an extract from a Kew Bulletin on the above grass. This was accompanied by photographs of a plant of this grass grown at the Botanical Experiment Station, Salisbury, taken at different periods. Since that period the plant has made further considerable growth, and Plate 1 shews this grass as it stood at the period of full maturity—16th June, 1913. The grass was then 15 feet high and in seed. The chemical analysis of this grass, quoted in the February issue, shewed it to be "comparable in feeding value to maize stalk roughage." Compared with sugar-cane fodder, it proved to be twice as rich in protein and equally rich in carbohydrates. It contained, however, three times more woody fibre than sugar-cane, and not half as much juice, so that Napier's Fodder would probably be less succulent and digestible than the cane. It was further pointed out that the ash of Napier's Fodder constituted a very valuable manure. When these circumstances are remembered, and when it is further known that the plant will keep green in Salisbury during the winter months although without making much growth, it is evident that we have here a plant of first importance in the great problem of providing cattle with succulent winter feed.

Since the previous article in the February issue, several new observations have been made with regard to the possibilities of this plant as a fodder. During the season 1912-13, the plot growing at the Botanical Experiment Station was cut twice. This was done when the plants had attained a height of six to seven feet, and before they shewed the least signs of

flowering. The weight of green fodder obtained from each cutting was at the rate of 12 and 15 tons, respectively, per acre. The plants were grown in rows four feet apart, and 18 to 24 inches between the plants. No irrigation was practised, but the season was a favourable one, with a rainfall of 29.8 inches. These plants are now in their second season. They were cut four times the first season, but no record was kept of the weight of fodder then obtained.

As this growth is made principally in summer, it is obvious that the best value can be obtained from the plant by utilising it for ensilage. For this purpose it would be useful to delay the cutting until the plant is about 10 to 12 feet high. This height is generally attained by the month of March or April. The weight per acre of fodder, by taking one cutting only at this period, has not been ascertained, but would probably not be less than 15 tons per acre, and in a favourable season would probably amount to 20 tons per acre in the case of plants of more than one year's growth. This could be ensiled either alone or with maize or velvet beans.

A comparison of an analysis of Napier's Fodder (Rhodesian) and green maize fodder as given in American returns is shewn below:—

	Napier's Fodder.	Green Maize Fodder.
Water	61.81	79.0
Ether extract	0.29	0.5
Protein	2.92	1.7
Carbohydrates	17.29	12.0
Woody fibre	14.77	5.6
Ash	2.92	1.2

The above figures for Napier's Fodder were obtained from plants cut in July. If cut in April or May a larger percentage of water would be shewn, and this is desirable for the making of ensilage.

The last of the two cuttings mentioned above was taken at the Botanical Experiment Station on the 31st March. By the middle of June a thick, leafy growth ten to twelve inches high had been made (see Plate 2). This growth will probably be stationary or, at best, very slow during the months of July to October. It is expected, however, that it will remain green throughout as it did last dry season, and that by the beginning

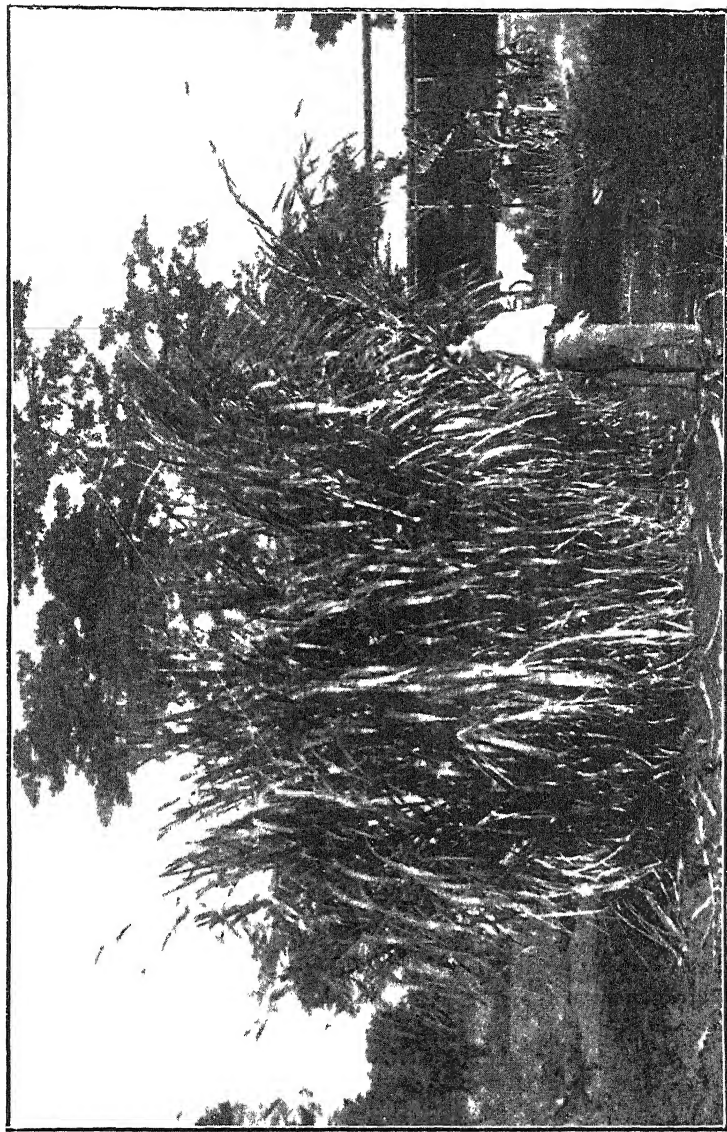


Plate I

Napier's Fodder at the period of full maturity—16th June, 1913



Plate II.

Napier's Fodder. Growth made by 1st July since the previous cutting taken on 31st March.



Plate III.

Napier's Fodder on sandy soil at the Longila Experiment Farm, Lochard, 31st May, 1913; slips planted February, 1913.



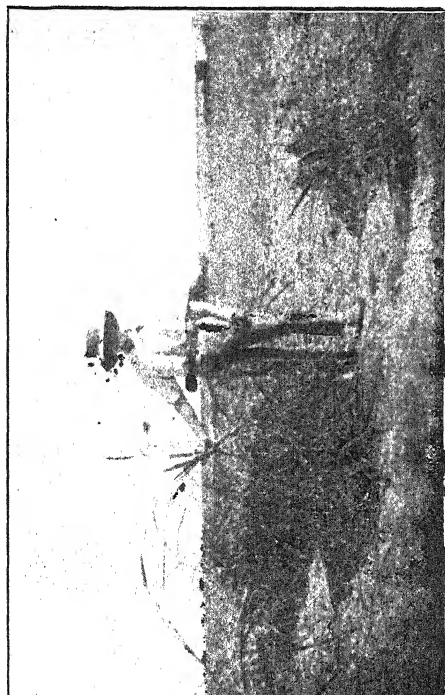


Plate IV.
 Sugar Cane on left. On sandy soil at Lochard ;
 Napier's Fodder on right, both planted February, 1913.

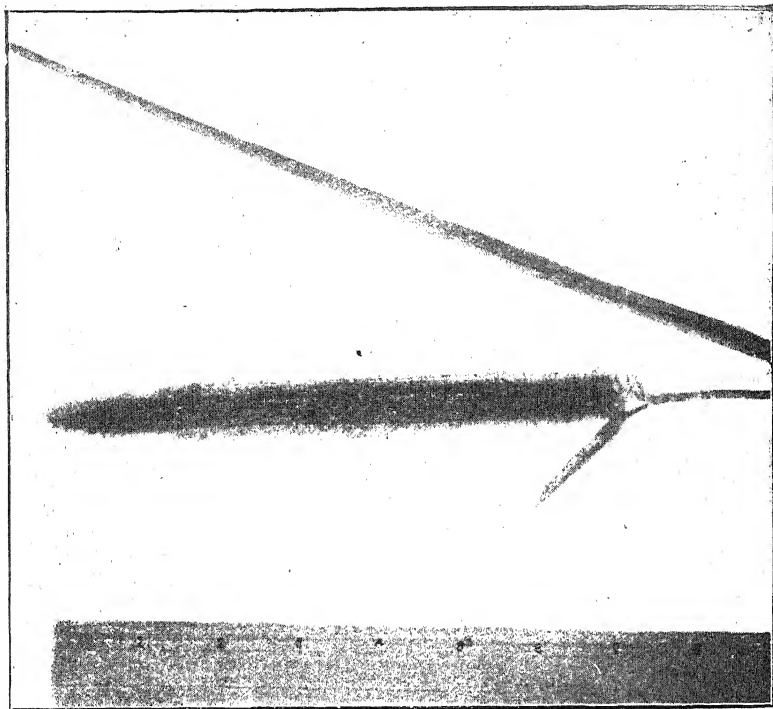


Plate V.
 Seed head of Napier's Fodder (*Pennisetum*)

of November a growth at least equal to that shewn on page 362 of the February issue will have been made. The value of such a provision of green material for winter grazing can hardly be over-estimated.

Some difficulty was experienced in converting this crop into hay on account of its succulent character and the coarseness of the stem. With a sufficiency of fine weather, this difficulty could probably be overcome. Its main value, however, if cut during the summer, would be as green fodder to stall-fed animals, for which purpose it can hardly be excelled by any other crop now grown in Rhodesia.

Napier's Fodder can be propagated in three ways; by means of seed, by means of rooted slips, and by cuttings. The plant if allowed to grow to maturity forms seed heads about May, and produces seed fairly abundantly. Seeds should be sown thinly in a prepared bed as early as November if water is available, otherwise in December or January with the rains. The young plants can be transplanted to their permanent positions when they are about six to twelve inches high. Perhaps the best and surest way to establish a plot of Napier's Fodder is by using rooted slips. A root of this plant suckers very freely, and may be split up into a great many rooted slips. These should be planted singly in rows four feet apart and three feet between the plants. After two or three years' growth each plant will have spread to such an extent that it will be possible to transplant every alternate row, leaving the rows eight feet apart. If this method is followed, a large acreage can be planted in a few years from a small beginning. The plants shewn in Plate 2 were established from slips planted in March, 1911, and each alternate row will be ready for transplanting in January, 1914.

If it is desired to grow the plant from cuttings, these should be taken when the plant is approaching maturity in May or June. Each cutting should be about 18 to 24 inches long, and should be placed slantwise in a prepared bed, about two-thirds of the cutting being under the ground. These cuttings should be kept shaded and moist, but not wet enough to rot them. They will be ready for transplanting the following January or February.

This plant shews remarkable resistance, both to drought and to frost. There is also no doubt that it responds readily

to irrigation. Provided irrigation can be practised, vigorous growth begins in October, especially in the case of plants that have been established more than one season. The amount of water required would seem to be small, and one of the principal values of the plant lies in the fact that it can be grown in dry situations where irrigation is out of the question. It is not advisable to plant out Napier's Fodder in damp situations where water is inclined to stand. Under these conditions the plant wilts, and is best replaced by paspalum.

Our experiments would seem to indicate that under poor conditions, such as dry situations, red or sandy soil, and cold localities, Napier's Fodder is to be preferred to sugar-cane. In warmer localities, with rich soil, where a rainfall of over 30 inches can be relied upon, sugar-cane is likely to give equal or better results, both in weight of fodder and in food value. At Salisbury, both during the dry season of 1911-12 and the favourable season of 1912-13, Napier's Fodder has shewn marked superiority over sugar-cane, particularly in the ease with which rooted slips have been established, and the number of times cuttings have been obtained.

The soil on which Napier's Fodder has done so well at the Botanical Experiment Station is the prevailing red soil of Mashonaland. This season an experiment was conducted with this plant to test its suitability to granite sandy soil. Rooted slips were planted at the Longila Experiment Farm, Lochard, last February, on rather a dry ridge. The rainfall since the time of planting was less than 12 inches. In spite of this, very few of the slips died, and most of them made remarkably vigorous growth, as Plate 3 will shew. Plate 4 shews the sugar-cane slips planted at the same time. It will be observed that the cane had made comparatively little growth under the same conditions. Both photographs were taken on the 31st May, 1913, and some of the Napier's Fodder stems were then standing over six feet high and seeding freely.

Very few slips are at present available for distribution from the Department of Agriculture. Steps are being taken, however, to obtain large supplies of this plant with the object of planting out a large acreage so that slips may be available to the farming community. It is hoped that by March, 1914, these will be ready for distribution.

Citrus Fruit Trees.

FROM SEED TO GROVE.

By CHAS. E. FARMER, Citrus Adviser to B.S.A. Company.

In the April issue of the *Agricultural Journal* I published a few practical hints on the preparation of the soil and the planting of a grove of citrus fruits. Since those hints were written the difficulty of purchasing the young trees, owing to the limited number of nurseries in South Africa, and especially in Rhodesia, and to the large number of purchasers, has become apparent. I will, therefore, endeavour to give some particulars shewing those unfamiliar with this kind of work how the trees can be grown on the farm from the "pip."

It is first necessary to select a place for the seed-beds where the soil is deep, mellow, well drained, and also warm. Low places near watercourses, such as are used for tobacco seed-beds, are not advisable, for they are likely to be frosty at night in the cool season, and the young lemon seedling is very susceptible to injury by frost. The spot should have an exposure to catch plenty of sun, but well protected from wind and situated where water can be obtained easily. Trench the soil and free it from grass and sticks, and form it into beds, level and smooth, of such a width that one can conveniently reach the centre from either side, as it will be necessary afterwards to hoe and weed the young plants. Outline the beds with brick as for tobacco beds, leaving a space 2 ft. wide between them as a pathway.

Obtain from a neighbour, if you do not happen to have them yourself, a sufficient supply of large, well-grown, and

thoroughly ripe wild lemons, known in Rhodesia as Mazoe lemons. Break them open—if cut through with a knife some pips will be damaged—and squeeze out the pips into a sieve, allowing the juice to drain away. Wash them free of pulp, and select the sleek, plump, well-to-do looking ones, discarding any that are small and ill-shapen, which will only make sickly plants if they germinate. Not all seeds are fit for use. Do not allow them to dry off before planting. If you have made the mistake of extracting the seed before preparing beds in which to plant them, they can be kept in sand, which has been well moistened, and placed in a box in a shady place; but do not continue to water, or the seed will rot. They can be kept in this way until they shew signs of sprouting. Those who cannot obtain the wild lemons in their neighbourhood, and who wish to grow some trees, may be supplied from some other source by the writer.

I do not recommend the practice of planting seeds in boxes; the young plants throw out a deep taproot, which is soon on the bottom of the box; also it is difficult to regulate the watering without having them either too wet or too dry. Open-ground planting is more satisfactory. Having the beds prepared as above, give them a good watering. Open trenches across them one inch deep and one foot apart, sow the seed in these little trenches, say, about an inch apart, and draw the soil over them, firming the whole afterwards with a board. If the surface soil has dried out while opening trenches and planting the seed, water again, but not too heavily, after firming with the board. Mulch the beds with grass or any other material which will keep in the moisture and shield from the hot sun; but not so heavily that the bed lies cold or the seed may rot. Water as often as the surface soil appears to be drying out and until the bed is moist, but not wet, to the depth where the seed lies. When the first plants are fairly up remove a part of the mulch, so that they will meet with no resistance in pushing their way upward, and as soon as it appears necessary remove altogether. It will be very beneficial when removing the mulch entirely to erect an awning of hessian or limbo by stretching a wire from end to end down the centre of the bed, giving it a double-pitched roof, the eaves of which should be high enough from the bricks lining the outside of the beds to give plenty of light and air, yet shelter-

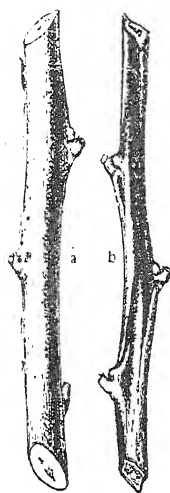


PLATE I

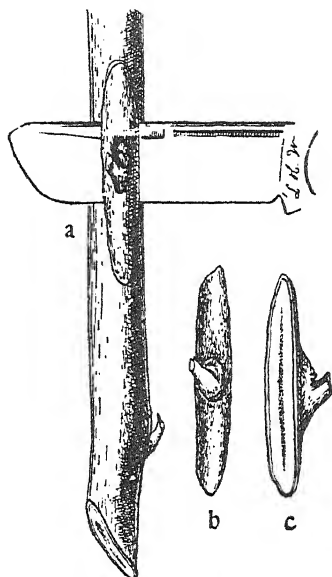


PLATE II.

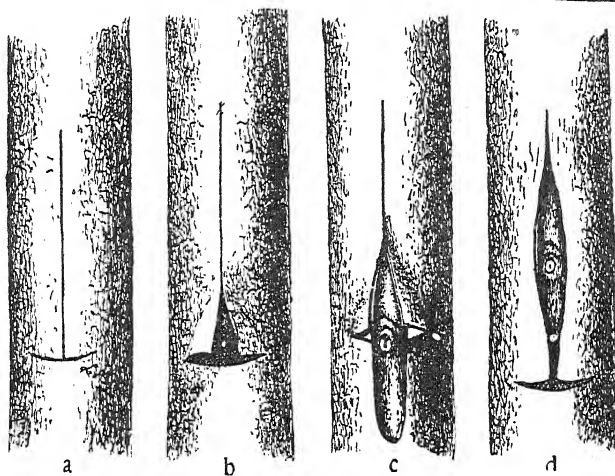


PLATE III

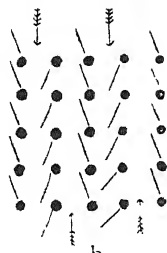


PLATE V



PLATE IV.

ing the young plants from the fierce heat of the sun, until they are old enough to stand it. During the cool season this awning can be let down at night as a precaution against frost. When the plants are from 12 to 18 inches high the grower can select his own time for removing them to the nursery, and further shelter may be dispensed with. Some species of ants are fond of young citrus leaves. If these species exist in Rhodesia, nip off the tiny plants and give the beds a dusting with air-slacked lime or hard-wood ashes.

The site for the nursery should be selected as carefully as for the seed-beds. The soil should be deep and well drained, but not necessarily extra rich. Nursery trees grown on very rich soil are apt to suffer when taken from the nursery and planted in the grove, unless, of course, the soil of the grove is as good as that of the nursery. It is like taking a daintily reared child and putting it upon a diet of coarse and insufficient food. Water will be required when the transplanting is done, and this should be considered in choosing the nursery site. Lay out the ground carefully; a little care now will save a great deal of work and annoyance in the future. Run the rows north and south, 4 ft. apart, to catch the sun on the whole surface of the ground, which should be smooth and free of roots. A simple plan is to take a wire a few feet longer than the rows are to be. Fasten one end to a stake, stretch it tightly along the direction the rows are to take, and fasten the other end. Mark off along this wire spaces 15 inches apart, which is a good distance for the young trees to stand from each other in the rows. The four-foot space between the rows permits the nursery being worked with a mule and cultivator, and the 15 inches between the trees permit the intermediate spaces being kept clean with the hoe as well as giving ample space for budding the seedlings when the time comes. These directions may seem uselessly precise and troublesome, but the ease with which the other work is done will more than repay for a little care at the start. It is easier to cultivate a straight row than a crooked one. When the first row of the nursery is ready for the trees, the work of taking them out of the seed-beds can be commenced. Do this with a straight spade, and take up all the roots you can without bruising, and place them in a bucket with water in the bottom, or lay them in boxes and cover the roots with moist earth. Do not expose the roots to

the sun a moment more than is necessary, nor take out of the beds more trees than you can protect in this way. Throw away the stunted and inferior ones. In planting use a strong dibble, and make a hole deep enough to accommodate the taproot without curling it up. If some taproots are too long for this, nip a piece off, and pack the soil well down round the roots with the dibble, leaving no air spaces, especially at the bottom of the hole and round the end of the taproot. Be most careful to plant the tree at the same depth at which it grew in the seed-bed; setting it at a greater depth is injurious. Before commencing to take up trees from the beds give them a good watering the day previous, and water the young trees as they are set out in the nursery. If this cannot be done easily, do not attempt to transplant until the rains are well on. For the first year let the trees grow as bushy as they please; the foliage will shade the tender bark of the stem and encourage the growth of the tender rootlets. If any die partly back after transplanting and shoot out with a double stem, one of these can be removed to keep the tree on a single stem. It is possibly wiser not to do more pruning than this until the trees are ready to bud. Keep the soil of the nursery well cultivated and the spaces between the trees clean with the hoe.

There are various ways of propagating citrus trees, that is, by budding and grafting, and there are various ways of grafting; but this latter method, except under very particular conditions, may be considered obsolete, and the reasons for its becoming so are well founded. Universal preference being given to the budding method of increasing the number of trees of any one variety by citrus fruit growers, it is not necessary, and may be confusing to beginners in this industry—and this article is intended for the guidance of beginners only—to describe the methods of grafting. There is no particular time at which citrus trees can or cannot be budded, provided there is sufficient sap in them to allow the bark to lift easily. In the nursery the work can be commenced as soon as the stocks or stems of the young trees are nearly the size of an ordinary lead-pencil.

The bud-wood must, of course, be taken from a tree of the variety you wish to propagate in the nursery, and to obtain it select twigs of the current year's growth, or of the last growth which has reached the proper state; that is, well-

matured twigs with round and well-filled-out wood and of the deeper green colour which denotes maturity, but the eyes on the matured twigs must not be bursting into a fresh growth. If the growth is of a light green colour, soft and angular, it is not ready to use. Plate No. 1 shews matured (a) and unmatured (b) twigs. This and the other illustrations in this article are reproduced from the Year Book, United States Department of Agriculture, 1896.

If it is desired to bud over an old tree with a large trunk and lateral branches, it is quite possible to do so, but for this purpose a larger twig of wood should be used, which will furnish a scion of sufficient size to prevent the thick bark of an old tree closing over it too much. Buds can be inserted in the main lateral branches, and the tree will rapidly form a fresh top of the new variety budded upon it.

It is perhaps the common practice not to cut the bud-wood from the parent tree until it is wanted for immediate use. This practice has several drawbacks, the chief of which is that when the nursery trees are ready and in condition to bud, that is when the sap is flowing freely in the spring and the bark lifts cleanly and easily, it will be found that the last growth of the previous season on the bearing trees has already burst into growth, and that many of the eyes on the twigs wanted for bud-wood are not in condition, entailing a great deal of waste before sufficient dormant eyes are obtained. Another drawback is that wood fresh from the tree is brittle, and will split with the grain ahead of the knife when cutting the scion, causing loss of time in trimming out the uneven surface caused by this splitting. For early spring budding, cut during the winter, when the trees are dormant and the last growth well matured, as much bud-wood as you are likely to require. Trim off the leaves, leaving just the stalks, and bury the twigs in the ground under a shady tree at such a depth that they will always be in moist ground and not affected by the drying-out or by the changes of temperature of the surface soil. In Rhodesia it may be necessary to place the twigs in moist, not wet, dirt in a tin box, and bury the whole, in order to avoid damage to the wood by the white ants. Bud-wood may be kept in this way for two or three months, the strength of the twig is drawn to the eyes, which become strong and plump.

A larger percentage of buds from seasoned wood will take, and they will grow out more quickly and vigorously. The wood of the twig will be tough and pliable, and will cut cleanly where the blade goes and without splitting. For budding at any season of the year it is an advantage to season the bud-wood, if only for a week or so. If bud-wood of several varieties of orange, lemon, and grape fruit is being cut for use later on, care must, of course, be taken to keep each variety separate and label the bundles, or different varieties will get mixed in the nursery.

A very sharp, thin-bladed knife is necessary. Budding knives made for the purpose can be obtained, and a supply of material to wrap the buds. If the weather is likely to be rainy, narrow strips of strong muslin or calico, dipped into a hot solution of two parts beeswax and one part resin and the superfluous wax stripped off while warm, may be used. But this may be rather unnecessary trouble to go to, and good results will be obtained at any season of the year with the use of raffia grass, obtainable locally and not expensive. A box or basket with a handle will be found useful in which to place the knife, oilstone, pruning shears, etc., while working from tree to tree.

Before beginning to bud the nursery trees, which will be bushy and have small lateral limbs from nearly the ground level upwards, trim them up and expose the stem to such a height as will permit the work of budding to be done without hindrance from this lower growth, but not high enough to give the tree too great a shock and check the flow of sap. Use a pair of hand-pruning shears, and make clean cuts close to the stem without leaving short stubs, and be careful not to injure the bark of the stem in doing so, or it may spoil just the spot in which you wish to insert the bud. This trimming is better done a week before commencing to bud, when the wounds will be in a healing condition and the flow of sap will have recovered from any check received.

Do not take into the nursery too many twigs of bud-wood; keep them wrapped in a piece of damp sacking, for they soon dry and shrivel if exposed to a hot sun, especially seasoned twigs. In cutting the scion from the twig, grip both the twig and knife firmly, and commence a good half-inch or more above

the eye, and as you cut bring the knife down at a sharp angle.. Plate No. 2 shews this operation, but the knife here is a good deal too much at right angles to the scion. The scion will be about the same length below as above the eye. It is entirely unnecessary, and indeed harmful, to remove the thin piece of wood cut out with the bud. The face surface of the scion must be level and smooth, and any irregularity must be trimmed out until all points will lie flat against the wood of the stock and exclude the air—even if such subsequent trimming reduces the length of the scion as originally cut.

Choose a place on the stock, an inch or so from the ground or higher if you like, which is free of bumps and hollows and where the bark is a light, fresh, healthy colour, indicating that the sap is flowing freely, and also free of eyes for the space required by the scion. For preference choose that side of the stock which catches the least sunshine, especially if you have trimmed rather high or the trees are not bushy enough to shade their stems. Having selected your spot, make a vertical cut $1\frac{1}{4}$ in. long, or a little longer than the scion. At the bottom of this make a horizontal cut, so that the two together form an inverted "T" (\perp) (see Plate No. 3a). The cuts should be clean and without ragging the edges of the bark, and not deep, the aim being to cut through the bark only. With the point of the knife-blade slightly raise the edges of the bark at the lower end of the cut (Plate 3b). Place the upper end of the scion under these raised edges (Plate 3c) and push it upward until the whole cut surface of the scion lies in contact with the wood of the stock and until the upper end of the scion is a little beyond the top of the vertical cut (Plate 3d). It is immaterial if the lower end of the scion is a little distance above the bottom of the horizontal cut. If the stocks are in condition to bud the bark will separate easily as the scion is pushed up, and takes its position, excluding the air.

It only remains to complete the operation that the bud be wrapped. To do this, take a piece of raffia grass, pass it behind the stock on a level with the horizontal cut, and take the end with the left hand, lower it, and pass the grass over it, and continue to wrap it firmly round the stem, taking care not to cover or bring it into actual contact with the eye of the bud, until the top of the vertical cut is reached. Finish off, not

by tying any kind of knot, but by passing the end under the last wrap and drawing it tight, taking care not to let the whole wrapping slip loose in finishing off. Wrap firmly enough to hold the scion in its place and exclude air and moisture, but not, of course, to cut or bruise the bark. Placed in this position with its top end just under the bark at the upper end of the vertical cut, the scion is in position to benefit by the direct flow of sap in its downward course, after having ascended the tree and been elaborated through the leaves, and thus fitted to perform its function of forming new wood along its course of descent. Placed otherwise, the scion may be left for its chance of life dependent upon such sap as it can obtain by lateral circulation.

If the scion remains green and fresh after the space of ten days from its insertion it is safe to presume that it has "taken." If the trees are growing rapidly and are young nursery stock, the wrap may be removed. If the stocks are older and with thick bark, the wraps may be left on a little longer, but should be loosened. To bring the buds "out," that is, to force them into growth, it is necessary in some way to check the growth of the stock without at the same time checking the flow of sap more than can be avoided. To cut the stock right through and thus lop off the whole of the top is too drastic, and will check the sap and harden and stunt that portion of the stock remaining and probably keep the bud dormant instead of forcing it into growth. I know of no better method than that practiced by the Florida growers, which is to cut with a knife the stock partly through about two inches above the bud, and bend it over until it lies on the ground (see Plate No. 4a). This checks the sap to some extent on that side of the stock containing the bud, but the flow is kept upward sufficiently to keep it healthy by the partly severed top, and at the same time the bud is usually brought out into actual growth, which further encourages the flow of sap and brings the stock back to its normal healthy condition. In a short time the bud will make a long enough growth to require support, and if trained will make a good, straight growth (see Plate No. 4b). Do not be in a hurry to remove the lopped top altogether, but leave it until the bud is large enough to require the full flow of sap the stock can supply. Then remove it with a sharp pruning saw, making a cut beginning rather below the bud on the opposite side of

the stock and upward, bringing the saw out just above the bud. If necessary trim this cut with a sharp knife until no stubby part is left above the bud. Apply a little paint to the wound.

It may be necessary in some cases, and in all cases it is probably better, to leave the lopped top attached to its stock for a year. It is necessary, therefore, to do the work in some systematic way in order that the cultivation of the nursery is not interfered with by these hanging tops. To accomplish this, cut and bend all the tops in the first row of the nursery in one direction, and let them lie near in to the row. In the second row bend them so that they lie in the opposite direction. In the third row the tops should lie in the same direction as in the first, and so on through the nursery. The cultivator can then be taken up one row and down the next, always passing in the direction the tops are inclined, so avoiding the branches catching in the teeth of the cultivator (see Plate No. 5). Buds which are put in at the end of the growing season, and intended to remain dormant until the cool season is over, are treated in exactly the same way, except that no lopping of tops is done until danger of frost at night is over. These buds have the whole growing season in front of them, and usually are very satisfactory.

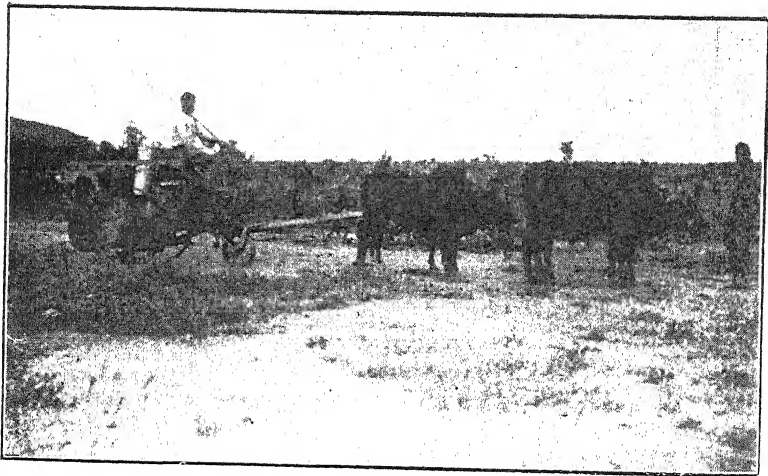
Culture of Tobacco.

TRANSPLANTING MACHINES.

By O. ZIMMERMANN, Darwendale, Salisbury.

With the fall in the price of tobacco, whether due to over-production, to the quality being inferior, or to any other cause, it behoves planters to look around and try to find and follow to a successful issue any means which will reduce the cost of production. One of the greatest disadvantages—and all who have grown bright leaf tobacco will agree—is the large amount of labour required to produce the finished article. One native per acre is generally quoted as necessary, and I have heard the opinion expressed that double this number is required. If Rhodesia is ever to rank as a large producer of the fragrant weed, it is high time we paid more attention to this side of the question, for even if we can procure sufficient labour to-day, it is a moral certainty we shall not be able to do so in the near future.

Having this in mind, I was tempted to try a Tobacco Transplanter, and against all advice, and in spite of previous failures in this country, procured a Bemis Planter of the latest pattern, through Messrs. Wm. Philippi & Co., direct from America. The machine was tried at first with two mules, but it was too heavy for the small type of animal generally used in this country, and they were not a success. Four steady oxen were then inspanned, and were found to haul the transplanter easily at the even pace required for good planting. The labour used was five boys in all, as follows:—One to draw plants, one voorlooper, one driver, and two planters.



Bemis Tobacco Transplanter.





Tobacco on right planted by machine; on left by hand.
Darwendale, Salisbury.



Tobacco on right planted by machine; on left by hand.
Darwendale, Salisbury.

The best result achieved, when they got into the working, was five acres planted a day; but in addition to these, five boys were required to carry the boxes of plants to the planter from the seed beds, which were situated 400 yards from the nearest point of the field to 1,000 yards at the farthest.

Small boxes, 20 inches by 12 inches, were made in which to carry the plants. One boy carried two boxes at a time, which were transferred to the planting boy on the machine without a halt. A water cask, which will hold 30 gallons, is carried on the machine, and this is sufficient to give one-eighth of a pint to 2,000 plants, or more or less if required, by opening and shutting the valve provided for the purpose. One would have to reckon two extra boys for this work, according to the distance of the water supply, but it was used very seldom last season, and I think could be dispensed with altogether, just as we do in hand planting.

The fertiliser attachment was not a success, the Safco being too sticky to feed properly, but this could no doubt be obviated by mixing it with dry sand in the required quantities.

Apart from the labour saved, which can be estimated at about 50 per cent., it was noticed that the plants took root and grew right away; in fact, ten acres required no replanting, while a similar area was refilled in a day by ten boys. This can be readily understood when one considers the two methods. With hand planting, a dropper is used, and the plant in unfavourable weather often lies on the ground exposed to wind and sun for a minute, in addition to which the earth is usually knocked from the roots in the extra handling the plant receives. With the transplanter method, the plants are carefully drawn from the seed beds and at once placed into the box previously mentioned. They are then carried to the machine, where the operator takes the box on to his knees and, taking hold of the two big leaves of the plant, lifts it out of the box and gently deposits it in the furrow made by the planter. If the boys are well arranged, it should only take about ten minutes at the most from the time the plant is pulled in the bed to when it is set in the furrow; while, owing to the boy planting being seated nearly on the ground, the plant retains its mould, and is set in the furrow intact, which enables it to get a stand at once, often without wilting.

Two boys of ordinary intelligence can work the machine, but it will take them a day to get into the action, and I would suggest they are initiated with small sticks or reeds before actually starting with the tobacco plants. Likewise a good driver is necessary if good straight rows are required; but, after all, mealies are planted with an ordinary driver and cultivated with oxen, so there is no reason why there should be any difficulty with tobacco.

Let me add, in conclusion, that the machine will require the personal supervision of the farmer, and so far as agricultural implements go, it is complicated, but not to an extent that one cannot master it in a day. When the machine is understood, and the boys taught their work, it will well repay any extra trouble one has been put to. The work is done far quicker, cheaper, and better, as the accompanying illustrations shew. The larger and even section on the right was planted by the machine the same day as the uneven section with the smaller plants on the left, which was planted by hand. Each section had fertiliser applied by hand simultaneously a week later.

Inyanga Wool.

The following are the prices realised for Inyanga wool at recent sales:—

2	Bales Greasy 1st Fleece, E. and W.,	at 8 $\frac{3}{4}$ d.	per lb.
5	" " " " E.	at 9d.	"
3	" " 2nd " E. and W.,	at 7 $\frac{3}{4}$ d.	"
1	" " " " "	at 8 $\frac{3}{4}$ d.	"
7	" " 1st Pieces, "	at 9d.	"
1	" " " " "	at 7 $\frac{1}{2}$ d.	"
2	" " Scoured Fleece Hogts	at 1/4	"
2	" " 2nd Pieces	at 1/4 $\frac{1}{2}$	"
1	" " Bellies	at 1/4 $\frac{1}{2}$	"
2	" " Locks	at 1/3	"

Twenty-six bales, weighing 8,060 lbs., sold for £334 6s. 5d.;
1,722 sheep were shorn.

The Arabi or Woolled Persian Sheep.

By W. J. BLACKLOCK HARRIS, Infiningwe.

The Arabi, or, as he is better known in South Africa now, the Woolled Persian, is probably the oldest known breed of wool-bearing sheep. Herodotus mentions the breed in the time of the great King Cyrus of Persia, some 500 years B.C. Even in those remote days the Arabi was renowned for its long-stapled wool, its great hardiness, and its ability to thrive upon scanty herbage of the most arid deserts, as well as for the excellence of its flesh. These attributes and extended trials in South Africa have proved that for huge areas of South Africa this breed of sheep is the best to run. It is well known that very many farmers have been ruined by attempting to breed and run Merinos upon farms where the conditions of life were too hard for them, owing to long periods of drought and scantiness of herbage. Thousands of men who have suffered have fallen back upon the hairy breeds of sheep, openly stating that their reason for so doing was that, though they would infinitely prefer to run Merinos, the risk of total loss was too great, and that the hairy sheep did manage to thrive in spite of hard conditions of life, whereas the Merinos died in thousands year after year. The hairy breeds only yield mutton, and a skin or pelt worth about 1s. 6d. each; they have no wool, but manage to thrive and multiply on huge areas where the wool-breeds mentioned before fail to find sufficient nourishment to enable them to keep alive. It is proved, however, that the Arabi will live, thrive and multiply on the most arid and the highest plateau in the sub-continent, on which even the toughest of the hairy breeds can barely exist, and will yield a minimum of five pounds of long wool, will furnish a well-built carcase of the finest mutton in existence, and a skin of

much greater commercial value than the pelts of the hairy breeds of sheep. In these circumstances the Arabi sheep is a far better business proposition to the South African farmer than is the hairy sheep. There is also another source of income open to the man who breeds Arabi sheep, and that is the production of Persian lamb skins. The Persians breed mainly for the skins of the newly born lambs, which are killed directly they are born and before they are able to suck, and these skins command high prices, being well known to commerce as "Astrakhan" and "Persian Lamb," which are utilised as a kind of fur. During the recent Coronation festivities the robes of the nobles were all more or less ornamented with miniver, which is none other than the aforementioned Persian lamb-skin fur. It is quite a common sight in European cities to see wealthy men wearing heavy overcoats lined and faced with the curly fur of the Persian lamb. The Persian Government prohibit the exportation of any sheep from the country, since they desire to maintain a monopoly of the trade in the best quality skins, a trade which brings into their country many millions of dollars annually. The true Arabi is hardy, thrifty, and very prolific, while the rams are prepotent to an extent I have never seen equalled by any other breed of sheep. They flock closely, and shew a united front to attack. The rams are bold, very strong, and charge like a steam-engine. The pure breed of Arabi sheep is said by some to be immune from scab, and by others to be highly resistant to the disease. The Americans also claim that the breed is resistant to scab, and they have scab pretty badly in U.S.A. The Americans also write very highly of the tremendous value of the Arabi and his crosses with the Merino as dual-purpose sheep.

One large American breeder stated that his lambs at 12 months old brought him in a return of 90s. each for wool and mutton alone. Ex-President Roosevelt writes: "It was the most delicious meat I ever ate," and several other famous American statesmen and *bon vivants* corroborate this statement. Not only is it good meat, but there is lots of it, and good mutton is a commercial asset of considerable value.

It really does seem a pity that a breed of sheep with so many great and real virtues, of such vast value to this country, should be so little known to the very people to whom it would

prove the greatest blessing; for not only is the pure-bred Arabi of great value, but the crosses from an Arabi sire from Merino ewes, and even from hairy bastard ewes, are valuable sheep. The Arabi blood gives strength, size of carcase, hardiness, and thriftiness. The first cross is a very valuable sheep, quite as hardy as any hairy bastard, and yielding a carcase more than twice as large and also a fleece of wool.

One of the many outstanding features of the value of the Arabi is the great strength of constitution which it possesses and which it passes on to its progeny; the lambs sired by a pure Arabi ram, whether from a pure Arabi ewe or a bastard ewe, are the strongest, most independent, hardiest, most vigorous lambs I have ever seen.

From Rhodesian experience of the breed, it would appear that the Arabi is immune from that dreaded disease, blue-tongue, and that as a cross with the ordinary native ewe or short-haired Persian leaves nothing to be desired; the result is a large, quick-maturing carcase of the most excellent mutton and excellent wool. They are, of course, not such a profitable sheep to run as the Arabi-Merino first cross, since the wool is less in quantity and inferior in quality owing to hemp and the shorter staple. Still, they are a much better farming proposition than the ordinary hairy bastards which are bred to such an enormous extent in so many parts of the country.

I am much indebted to Mr. Wardrop, of Port Elizabeth, for a description of the breed and other particulars from which this article is culled, he being the first gentleman to introduce the breed into South Africa, some eight years ago.

Potato Spraying Experiments for the Control of Early Blight

(*Alternaria solani* sor.).

By RUPERT W. JACK, F.E.S., Government Entomologist.

Throughout Southern Rhodesia the disease of potato plants known as Early Blight is the cause of heavy annual loss to the bulk of potato growers. Crops are sometimes grown free from this disease, but the general rule appears to be that the crop becomes severely blighted shortly after flowering, and the yield of tubers is correspondingly reduced. It is quite surprising, however, what a number of people are completely ignorant of the nature of this trouble, mistaking the premature blighting of the crop for the natural dying-down of the plants. A few words, therefore, on the appearance of the diseased plants will not be out of place as a preliminary to the report on the results of spraying experiments conducted at the Agricultural Experiment Station, Salisbury, during the past season. The presence of the disease is first betrayed by the appearance of small brown spots on the leaves. These spots become more numerous and increase in size until the whole leaf is withered and dried up, the blighted leaves hanging from the still green stems, which gradually turn brown and collapse, until the whole plant is dead. The disease is confined to the foliage, and does not injure the tubers or the roots. The result of the premature decay of the plants, however, is that the tubers are deprived of a portion of the starch which the foliage should form from the atmosphere, and their development is arrested, resulting in a light crop of small sized tubers, which are also

deficient in keeping qualities. The appearance of a blighted plant is thus quite distinct from that of one that yellows gradually and dies off in the usual way after reaching maturity.

Different varieties of potatoes vary considerably in resistance to this disease. An experimental planting of different varieties was made by the Division of Agriculture and Botany at Salisbury in the 1911-12 season, and notes as to relative resistance to Early Blight were made by the present writer. The varieties tested comprised:—Duke of York, Sir J. Llewellyn, Scottish Triumph, Early Rose, Acquisition, King Edward VII., Up-to-date, Factor, British Queen, Midlothian Early, and Carter's Long Keeper. Of these, Up-to-date, Factor, and Carter's Long Keeper proved by far the most resistant to blight, Early Rose succumbing amongst the earliest.

Early Blight appears to be the only leaf disease of potatoes prevalent in the Territory, the Late Blight or Irish Potato Blight (*Phytophthora infestans*) never having been noticed. It is probable that the natural dryness of the atmosphere is inimical to the latter disease, for though the rainfall in the wet season is heavy enough, the sun has a rapid drying effect, and heavy, still, damp weather so favourable to Late Blight is almost unknown. In spite of the success of the extensive spraying experiments recently completed in the New York State, having extended over a period of ten years and demonstrated clearly that though the ravages of blight vary from year to year, spraying as a regular practice pays handsomely, it has seemed necessary to attempt experiments in this country to determine whether under the economic conditions prevailing here it pays to spray for Early Blight alone. The experiments conducted have been of most modest dimensions, but largely owing to the high prices fetched by potatoes in this country it appears fairly certain that spraying will pay very handsomely indeed as a regular practice, for during the four years the writer has been in this country, Early Blight, although varying somewhat in intensity from year to year, has each season wrought very heavy mischief to the crop, and the disease can apparently be expected to appear with tolerable certainty.

Comparative spraying experiments were conducted on an unmanured plot of Up-to-date in the 1911-12 season, but, although it was demonstrated that various strengths of dilute Bordeaux Mixture delayed the progress of the disease when spraying was commenced before the leaves became spotted, the season was such a dry one that the yield of tubers was too small to permit of effective comparisons between the sprayed and unsprayed rows. One point was, however, clearly demonstrated, namely, that to attempt to control the disease once the spots had appeared on the leaves was worse than useless. A single row each of Duke of York, Sir J. Llewellyn, Early Rose and Up-to-date were sprayed three times after the disease had appeared with Bordeaux Mixture at full strength at seven-day intervals, and succumbed to the blight as quickly as the unsprayed rows. A similar experiment was conducted at the writer's own plot, but both full strength and three-quarter strength Bordeaux was used. The results were similar. This agrees with results of experiments in spraying to control this disease in other countries.

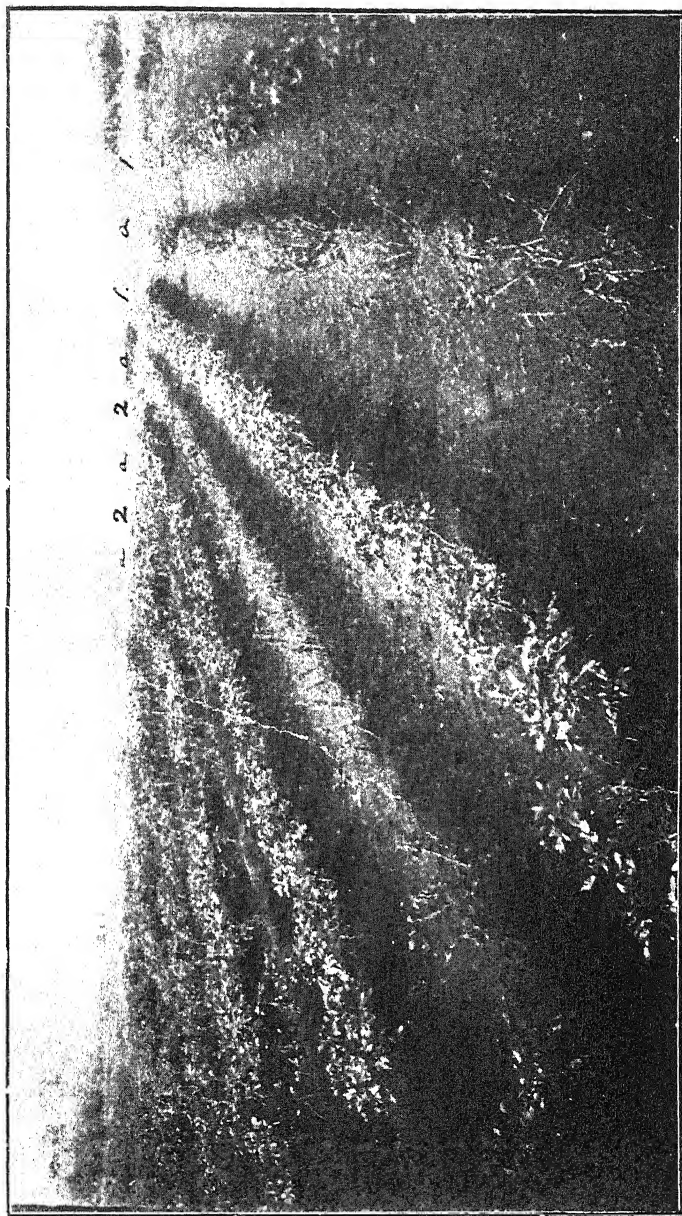
It may be mentioned that a proprietary fungicide which is on the market in Salisbury, the active principle of which appears to be a sulphide, was used in parallel tests with Bordeaux Mixture on the plot where spraying was commenced before the appearance of the disease, and that not the slightest difference between the sprayed and the check rows could be distinguished. This also accords with the results of certain experiments recently conducted in the United States of America, shewing that lime sulphide, though effective against many plant diseases, is not to be compared with preparations of copper sulphate for potato spraying.

During the past season (1912-13) the previous season's experiments were repeated with certain modifications. The bulk of the plot was planted with French Early Rose and the remainder with Northern Star, the latter being used to complete the plot, as sufficient Early Rose seed could not be procured in Salisbury at the time it was required. Bordeaux Mixture was used at two strengths for spraying. The formula for this fungicide at full strength is:—

Copper Sulphate (Bluestone), 6 lbs.

Quick or good water-slacked Lime, 6 to 8 lbs.

Water, 50 gallons.



Plot of Potatoes used in experiment re control of Early Blight (*Alternaria solani*),
 1. 1. Two rows sprayed every seven days with Bordeaux Mixture according to the formula : $4\frac{1}{2}$ lbs. Copper Sulphate,
 $4\frac{1}{2}$ lbs. Quick Lime, and 50 gallons water.
 2. 2. Two rows sprayed every fourteen days with same formula. Other rows are distinguishable in photograph.
 a. a. a. Unsprayed rows.



This formula may be referred to shortly as the 6—6—50 formula. The two strengths used in this season's tests were three-quarter and half strengths, namely, $4\frac{1}{2}$ — $4\frac{1}{2}$ —50 and 3—3—50. Each strength was tested at 7-day intervals, 14-day intervals, and 21-day intervals, spraying commencing when the plants were four to six inches above ground. The first date of spraying was 20th January. Seven sprayings were given at the 7-day interval, four at the 14-day interval, and three at the 21-day interval. These sprayings were all on Early Rose. The Northern Star portion, which was planted later and comprised 14 rows in all, was divided into two portions, which were treated with $4\frac{1}{2}$ — $4\frac{1}{2}$ —50 and 3—3—50 formulæ respectively at 14-day intervals as being the most suitable interval for practical work. Throughout the whole plot only the alternate rows were sprayed, so that each sprayed row was checked by a control immediately adjacent. This was a necessary precaution, because the disease is apt to attack a plot unevenly, and the ground is also apt to vary in fertility at different parts. Both these sources of error, in fact, occurred in the plot used, and had only a few rows been kept as controls, the results would have been untrustworthy.

The soil of the plot used is the red dioritic, on which the Agricultural Experiment Station at Salisbury is situated. No manure was applied, and the crop was a comparatively light one. Good rains fell at frequent intervals throughout the period of growth, no prolonged dry spells being experienced. Observations on the condition of the sprayed and unsprayed plants were recorded regularly. The disease was first noticed on the Early Rose on 10th February. On 24th February there was a noticeable difference in injury between the sprayed and unsprayed rows in favour of the former, the difference being noticeable at both strengths and at all the intervals between the sprayings. On 3rd March the 7-day sprayings at both strengths shewed to the best advantage, although the 14-day sprayings were almost as good. The rows sprayed at the 21-day interval were by this time seriously damaged by the blight. The control rows were all seriously injured. By 17th March the control rows were practically all dead, but there were still green plants amongst the rows sprayed weekly and fortnightly at both strengths. The disease was, however, very bad by this time, even in the sprayed rows.

The Northern Star plot was sprayed first on 17th February, when the plants were from three to six inches in height, again on 4th March, and finally on 17th March. Spots began to appear on the leaves about the date of the last spraying, and the disease developed very rapidly. By 26th March the control rows were badly injured by the blight, and the sprayed ones only slightly. By 3rd April the controls were practically all dead, whilst there was considerable disease amongst even the sprayed rows. Many plants in the sprayed rows were still green on 11th April, whilst all the controls were dead.

The comparative yields of the sprayed and unsprayed rows in the Early Rose experiments are summed up in the following table:—

FRENCH EARLY ROSE.

Strength.	Number of Applications.	Interval Days.	Total Yield.			Table Tubers.			Seed Tubers.			Marketable Tubers.
			Sprayed lbs.	Un-sprayed lbs.	Increase %	Sprayed lbs.	Un-sprayed lbs.	Increase %	Sprayed lbs.	Un-sprayed lbs.	Increase %	
4½-4½-50	7	7	61½	44½	38.9	39½	19½	103.8	16	18½	-14.6	45.3
	4	14	60	49½	21.2	39½	23½	66.3	15½	17	-10.2	34.3
	3	21	61½	52½	16.5	38½	27	43.5	17½	19	-6.5	22.8
3-3-50	7	7	80½	65	23.8	52½	37½	40	21½	21½	+2.3	26.3
	4	14	89½	79½	12.2	56	40½	38.2	25½	31½	-18.4	13.5
	3	21	94	83	13.2	60½	49	23.9	24½	28½	-13.1	10.3

The above figures represent the yield from two rows 25 yards in length.

It is to be noted that the increase per cent. of the marketable tubers in the sprayed rows over the unsprayed is in most cases greatly in advance of the total increase per cent. Thus the total increase in the rows sprayed with the $4\frac{1}{2}$ — $4\frac{1}{2}$ —50 formula each 14 days is 21.3 per cent., whilst the increase in the marketable tubers is 34.3 per cent.

The results with the Northern Star, which were planted later, were even more favourable, though less consistent. The crop was a very poor one, and the proportion of worthless tubers large. By an oversight table and seed tubers were not weighed separately. Four rows were treated in each case.

NORTHERN STAR.

Strength.	Interval. days.	No. of Spraying.	Total Yield.			Marketable Tubers.		
			Sprayed. lbs.	Unsprayed. lbs.	Increase. %	Sprayed lbs.	Unsprayed lbs.	Increase. %
$4\frac{1}{2}$ — $4\frac{1}{2}$ —50	14	3	106 $\frac{3}{4}$	79 $\frac{1}{2}$	34.2	67 $\frac{1}{2}$	37 $\frac{3}{4}$	78.8
3-3-50	14	3	146	110*	32.7	113 $\frac{1}{2}$	56*	102.6

*One control row was lacking in each instance, so the average of the three present was added.

Whilst the writer is of opinion that the percentage of increase is a better indication of the value of spraying in general than the actual gain obtained under the unfavourable conditions under which the crop was grown in the present instance, it is of considerable interest to note that the value of the increase per acre due entirely to spraying is, even under the conditions of the very poor crop obtained in the unsprayed rows, well ahead of the expense of the treatment in every case. The rows were 25 yards long, which at 34 inches apart makes about 205 rows to the acre. It should be noted that in the following table the estimated cost of spraying is probably considerably ahead of what is actually the case in practice. The amount of liquid used is reckoned as 100 gallons, whereas as a rule the amount varies between 50 and 75 gallons. The aim is to err on the right side in making the estimate of cost. Marketable tubers only are counted, and the value is reckoned at 1 $\frac{1}{2}$ d. per lb.

FRENCH EARLY ROSE.

Strength.	Interval. days.	No. of Applica- tions.	Increase per acre. lbs.	Value	Cost of Spraying.	Net Profit per acre from Spraying.
				£ s. d.	£ s. d.	£ s. d.
4½-4½-50	7	7	1760	11 0 0	3 10 0	7 10 0
	14	4	1435	8 19 4	2 0 0	6 19 4
	21	3	1076	6 14 6	1 10 0	5 4 6
3-3-50	7	7	1582	9 17 9	2 12 6	7 5 3
	14	4	999	6 4 10	1 10 0	4 14 10
	21	3	820	5 2 6	1 2 6	4 0 0

In addition to the actual gain in weight, there is no doubt that the tubers from the sprayed plants, having more time to mature, are better keepers than those from blighted plants, an important consideration in a country where such a long period interposes between the maturing of one crop and the planting of the next. It is probable that the gain through spraying a crop grown on well-manured soil will considerably exceed the above figures; at least for varieties very susceptible to blight, such as Early Rose.

The above experiments must certainly not be taken as indicating *accurately* the advantages obtainable from spraying the potato crop. Many years of experimenting would not yield such a result, because the disease varies much in the intensity of its attack, making the ratio between the cost of spraying and the increased return far from constant. The reader should pay attention to the conditions under which the experiments were conducted in order to appreciate their lesson to the full and to realise their limitations. The following are the most important conditions influencing or likely to influence the results:—

- (1) The season 1912-13 was a favourable one for the development of Early Blight.
- (2) The varieties, Early Rose and Northern Star, are amongst those more susceptible to the disease than Up-to-date or Factor.
- (3) The ground was not naturally very fertile, and was not manured.

- (4) The ground had been planted with potatoes the previous year, and the crop had been severely attacked by blight.
- (5) The spraying was carried out with a care and thoroughness that would rarely be effected under ordinary farm conditions.

Next season it is hoped to carry out further spraying experiments on well-manured land, and including Up-to-dates as well as Early Rose.

In addition to the value to be obtained from the checking of Early Blight, those farmers who suffer from the attacks of ladybirds, other beetles, and leaf-eating caterpillars on their potato crops may combine an arsenical preparation with the Bordeaux Mixture, and so obtain relief from both disease and insect attack. This may take the form of 3 lbs. of Arsenate of Lead to the 50 gallons of Bordeaux Mixture, of 4 ozs. of Paris Green or of Arsenite of Lime, prepared according to the directions given in Appendix 2.

Knapsack pumps suitable for spraying potatoes are abundantly stocked in Rhodesian towns, and cost about 70s. apiece. There is one point which must be insisted on in the purchase of these articles, and that is *that the tank be of copper, and not of galvanised iron*. The copper sulphate in the Bordeaux Mixture will eat through the galvanised iron in a very short space of time. For the same reason, wooden barrels should be used in the preparation of the mixture in preference to galvanised or plain iron or steel tanks. Another point is that the foliage needs to be sprayed thoroughly on both surfaces, and for this purpose the rod which holds the nozzle should be bent at right angles, so that the spray can be directed upwards towards the under surface of the leaves without trouble.

To sum up the recommendations based on the results of the past season's experiments and of the results of research in other countries:—

- (1) Early Blight (*Alternaria solani*) may be checked to a paying extent by spraying with Bordeaux Mixture (4½—4½—50), commencing when the plants are from four to six inches high.

- (2) It is almost useless to commence spraying after the disease has appeared on the leaves.
- (3) Three or four sprayings should be sufficient to give good results, but seven weekly sprayings would probably pay better if practicable.
- (4) Not less than 75 gallons per acre should be used.
- (5) The spray is, under Rhodesian conditions, best applied from knapsack pumps, which must have copper tanks.
- (6) An arsenical may be combined with the Bordeaux Mixture for the destruction of ladybirds, other beetles, and caterpillars, which devour the foliage.

Appendix I.—Bordeaux Mixture:—

Copper Sulphate, $4\frac{1}{2}$ lbs.

Quicklime or good water-slaked Lime, $4\frac{1}{2}$ to 6 lbs.

Water, 50 gallons.

Dissolve the copper sulphate and dilute to 25 gallons. Slowly slake the lime and dilute with the remaining 25 gallons. When cool, mix part for part in a third vessel and use at once. Keep stirred. The sulphate will dissolve readily in a little hot water; and will dissolve slowly in cold water if suspended, say, in a bag of coarse cloth, near the surface. The slaking of the lime had best be started with hot water, and continued by the slow addition of cold water until the mass is broken up and mixes to a smooth paste; and at no time should the lime be allowed to get dry. Ordinary kiln-slaked lime may be employed if it is quite fresh, or has been well kept, but at least six pounds should be taken. The lime mixture should be well strained to remove sand.

The prepared mixture should be tested with the clean blade of a steel knife. If there is not sufficient lime the blade will, after immersion for a few minutes, become coated with a deposit of copper. When this happens, lime should be added until the copper sulphate is all taken into combination.

Bordeaux Mixture will keep a week or more, but a freshly prepared mixture has advantages over one that has stood. Stock preparations of the two ingredients keep indefinitely, and from them the mixture can be quickly made as needed; the two may be kept in concentrated condition, but they should both be diluted before they are mixed.

Copper sulphate and Bordeaux Mixture are injurious to iron and tin, but not copper. The solution of the former and the mixing are generally done in wooden barrels or tanks.

Paris Green may be safely mixed with Bordeaux Mixture: one-quarter pound is generally used for mixing with a mixture made according to the formula given. Three pounds of Arsenate of Lead may be used in the same way.

Appendix 2.—Bordeaux Mixture and Arsenite of Lime:—

Copper Sulphate, $4\frac{1}{2}$ lbs.

Quick or good water-slaked Lime, $6\frac{1}{2}$ to 8 lbs.

Arsenite of Soda, 4 ozs.

Water, 50 gallons.

To prepare the above, the two separate barrels should be prepared as recommended under Appendix 1 for pure Bordeaux, using, however, two pounds more lime. The Arsenite of Soda should be dissolved in a little boiling water and stirred into the barrel containing lime and water. It unites rapidly with a portion of the lime, forming Arsenite of Lime, which is the cheapest insoluble compound of arsenic used in spraying foliage. Arsenite of Soda costs 9d. per lb. in Salisbury.

The Manuring of Maize on the Government Experimental Farm, Gwebi.

By G. N. BLACKSHAW, B.Sc., F.C.S.,
Government Agricultural Chemist.

In order to determine the effect of fertilisers in the second season after their application, the land, upon which a manurial experiment was conducted in the season 1911-12, was again planted with maize during the past season (1912-13) without a further application of fertiliser. A full report upon the results of the manurial trial of 1911-12 appeared in the *Agricultural Journal* of August, 1912, and whilst it will be necessary here to recapitulate some of the more important features of that report, the reader is referred to that issue for a detailed account of the experiment. Briefly stated, the experiment, which has been carried out in co-operation with the Government Agriculturist, has had for its object the acquirement of information regarding the effect of Superphosphate, Sulphate of Potash, and Nitrate of Soda, in various combinations, upon the yield of maize, and *a priori* whether on land of character similar to that under trial, the use of fertiliser for maize production at present market prices is a profitable investment.

The land selected for the experiment—a red loam, common to most parts of the Gwebi Flats—has now been under maize for the past four seasons, the crop being grown for the two seasons prior to 1911-12 without any manurial treatment. The mechanical and chemical composition of the first nine inches of the soil was as follows:—

Mechanical Composition		Chemical Composition	
Coarse gravel, over 3 m.m. ...	0·1	Silica and refractory silicates... ..	69·57
Fine gravel, 1—3 m.m. ...	2·7	Ferric oxide and alumina	18·25
Coarse sand, .2—1 m.m. ...	11·3	Lime	0·26
Fine sand, .04—2 m.m. ...	15·6	Magnesia	0·26
Silt, .01—.04 m.m. ...	20·2	Loss on ignition	11·70
Fine silt and clay (by difference), under .01 m.m. ...	38·4	Potash	0·10
Loss on ignition (water and organic matter) ...	11·7	Phosphoric oxide	0·042
Calcium carbonate ...	trace		<u>100·182</u>
	<u>100·0</u>	Total Nitrogen	0·125
		Soluble in 1% citric acid solution.	
		Potash	0·003
		Phosphoric oxide	0·0011%

The following are the particulars regarding the rainfall at the Gwebi Farm for the seasons 1911-12 and 1912-13:—

			1911-12.	1912-13.
October	...	...	0.00	0.02
November	...	...	0.25	0.90
December	...	...	4.25	11.01
January	...	...	13.00	6.80
February	...	...	8.00	9.92
March	...	...	1.25	6.86
April	...	...	1.50	3.12
May	...	...	0.00	3.13
June	...	...	0.08	0.00
			<u>28.33</u>	<u>41.76</u>

The preparatory cultivation of the land was as follows:—
Ploughed once, run over with clod crusher twice, and disc-harrowed twice. The seed was planted between the 26th and 30th November, 1912.

Selected seed of the Salisbury White variety was used in the trial in both seasons, and the size of each plot was one acre, each manurial treatment being conducted in duplicate.

The returns obtained from the various dressings are shewn below:—

TABLE I.

Effect of Fertilisers in 1912 (first season after application).

No. of Manurial Dressing	Manurial Dressing, per acre	Total Yield of Grain per acre. lbs.	Increase due to Manuring, per acre. lbs.
(1)	No manure	1,248	...
(2)	75 lbs. double superphosphate	1,612	364
(3)	{ 75 lbs. nitrate of soda 75 lbs. double superphosphate	1,634	386
(4)	{ 75 lbs. nitrate of soda 40 lbs. sulphate of potash	1,642	394
(5)	{ 75 lbs. double superphosphate 40 lbs. sulphate of potash	2,220	972
(6)	{ 75 lbs. nitrate of soda 75 lbs. double superphosphate 40 lbs. sulphate of potash	2,396	1,148

On reference to the above table, it will be noted:—

- (1) That superphosphate and sulphate of potash (dressing No. 5) gave a marked increase per acre—972 lbs.—over the unmanured land.
- (2) That the complete dressing (No. 6), *viz.*, a mixture of superphosphate, sulphate of potash, and nitrate of soda, gave the heaviest yield—2,396 lbs.—being 1,148 lbs. in excess of the yield obtained on the unmanured land.
- (3) That the dressing of potassic fertiliser (sulphate of potash) had a marked influence upon the yield when used in conjunction with superphosphate alone and when compounded with superphosphate and nitrate of soda.

The returns obtained from the plots last season (1913), which is the second season after the application of the fertiliser, are given in the following table:—

TABLE II.

Effect of Fertilisers in 1913 (second season after application).

Manurial Dressing (<i>vide</i> Table I.)	Total Yield of Grain per acre.	RESIDUAL VALUE, Increase per acre due to fertiliser applied to pre- vious crop.
	lbs.	lbs.
(1)	1,827	...
(2)	2,145	318
(3)	2,296	469
(4)	1,855	28
(5)	2,161	334
(6)	2,329	502

Before drawing attention to the results obtained in the second season, it should be pointed out that little or no nitrate of soda remains in the land for the second season's crop. Soil has very little retentive power for this fertiliser, and what is not made use of in the first year is largely, if not entirely, washed out of the land. It may be concluded, therefore, that the nitrate of soda applied in season 1911-12 had no influence upon the yield in season 1912-13. Superphosphate and sulphate of potash are, on the other hand, not easily washed out of the land, consequently the major portion of any residue remaining after the first season's crop is taken off will be available for the succeeding crop.

The points to be noted in Table II. above are :—

- (1) That the yield obtained on the plots is on the average higher than was the case in the previous season, *e.g.*, the unmanured plots in 1912 gave a return of 1,248 lbs. per acre, whereas the same plots in 1913 yielded 1,827 lbs. per acre, a difference of nearly three bags. In the season 1912-13, the maize was planted much earlier, and this, coupled with the very favourable season in the district, accounts for the higher yields all round compared with 1912.
- (2) That the increased return obtained on the fertilised plots, except No. 4, was between 318 and 502 lbs.
- (3) That, as nitrate of soda has no effect in the second year after application for the reasons mentioned above, the increased returns in the case of dressings Nos. 2 and 3 must be due to the residual superphos-

phate. The increases on these two plots were 318 and 469 lbs. respectively, a difference of 151 lbs., which is within the limits of experimental error. In the case of dressings 5 and 6, the increased returns must be due to the residue remaining from the application of superphosphate and sulphate of potash, and these increases were 334 and 502 lbs. respectively, a difference of 168 lbs., which is also within the limits of experimental error.

The average increase on Nos. 2 and 3 (residual superphosphate) was 393 lbs., and the average increase in the case of Nos. 5 and 6 (residual superphosphate and sulphate of potash) was 418 lbs., a difference of only 25 lbs., consequently we are led to conclude that the increased yields on Nos. 5 and 6 were largely, if not entirely, due to the residual superphosphate; the natural inference regarding the sulphate of potash, which had such a beneficial effect in the first season, being one of two things—either no residue remained from the sulphate of potash applied in the season 1911-12, or, if there was a residue, it had practically no effect upon the yield. This inference is corroborated by the return obtained in the case of dressing No. 4, from which the yield was practically the same as on the unmanured land.

Combining the yields obtained in season 1911-12 and season 1912-13 and the increases obtained, we get the following data:—

TABLE III.

Combined yields obtained in seasons 1911-12 and 1912-13 and the increases resulting from the application of fertiliser.

Number of manurial dressing (<i>vide</i> Table I.)	Combined yield in seasons 1911-12 and 1912-13 per acre. lbs.	Total increase in seasons 1911-12 and 1912-13 due to fertil- isers applied in season 1911-12. lbs.	Cost of manurial dressing.
(1)	3,075	—	—
(2)	3,757	682	13/-
(3)	3,930	855	25/-
(4)	3,497	422	20/8
(5)	4,381	1,306	19/6
(6)	4,725	1,650	32/6

The best returns have been obtained from dressings 5 and 6, and in the above table we note that dressing No. 6, costing 32s. 6d. per acre, gave in the two seasons a total increase of 1,650 lbs. per acre, approximately eight bags of maize. Dressing No. 5 in the same period gave an increase of 1,306 lbs. per acre, or approximately 6½ bags for the expenditure of 19s. 6d.

Another interesting feature noted in connection with these trials was the effect of the various fertiliser dressings upon the relative proportion of good ears to nubbins. In this respect the following data were obtained:—

TABLE IV.

Proportion of cobs six inches and over in length to cobs under six inches on the unmanured and manured plots.

Manurial dressing (vide Table I.)	Cobs 6 inches and over in length per cent.	
	1912	1913
(1)	30	41
(2)	38	42
(3)	40	51
(4)	47	42
(5)	52	52
(6)	56	62

A study of Table IV. with Tables I. and II. shews that a close relationship exists between the proportion of good ears and the yield of grain per acre. The higher proportion of good ears on both the unmanured and manured plots in 1913, when compared with the same plots in 1912, was doubtless due to continued selection of seed, earlier planting, and a more favourable season.

From these results the grower may conclude that the judicious application of fertiliser for maize production on red land similar to that under trial is a good investment. At the same time our experience of manuring for maize is only limited, and in consequence *farmers are not advised to dress a very large acreage until they have first determined that their lands respond profitably to the treatment.* We all know that

land varies in fertility, and it is in consequence necessary for each grower to first put his soil to the test, or note the results which his neighbour may already have obtained on similar soil.

The dressing recommended for trial last year cost at the time 28s. 6d. per acre in Salisbury (*vide* last year's report on maize manuring). In the opinion of many maize growers, however, this outlay is rather high, and until we have further proof regarding the efficacy of this dressing, it is for the present proposed to reduce the outlay in fertiliser from 28s. 6d. to 20s. per acre by substituting for trial a mixture made up as follows:—

35 lbs. Nitrate of Soda.

65 lbs. Double Superphosphate.

25 lbs. Sulphate of Potash.

This supplies 5 lbs. nitrogen, 27 lbs. phosphoric oxide, and 12 lbs. potash, in forms quickly available to the plant.

Borers in Native Timber.

RESULTS OF EXPERIMENTS WITH PRESERVATIVES.

By RUPERT W. JACK, F.E.S., Government Entomologist.

Native woods, such as msassa, mtondo, mfuti, mahobohobo, etc., are largely used in Southern Rhodesia for farm buildings, rafters, verandah poles, and in still greater quantities for the timbering of mines. The life of these timbers is very greatly shortened through the attacks of wood-boring beetles of various species. In the warm, damp galleries of the mines the damage is especially severe, and according to the statement of the manager of one well-known mine, timber that should last for several years frequently has to be replaced in about six months on account of borer attack. Enquiries for information concerning suitable preservatives to protect native wood from borers have often been addressed to the writer, but the subject seems to have been much neglected, so that a search amongst the available entomological literature yielded very meagre results. The general recommendation is to soak the wood in water for a prolonged period before use, the theory being that the water will dissolve out from the wood the ingredients which render it attractive to the beetles. On the strength of this the writer recommended an enquirer to adopt this method, and on visiting the farm some time afterwards, was shewn wood that had been left in running water for several months and then used for verandah poles. These poles were all bored to a greater or lesser extent. Another recommendation, which seemed rather technical, was not to cut the wood during the first quarter and full-moon weeks, on the theory of a monthly rise and fall of sap.

In order to supply the information that appeared to be lacking, an experiment was undertaken in August, 1910, different pieces of wood cut at the same time being treated with

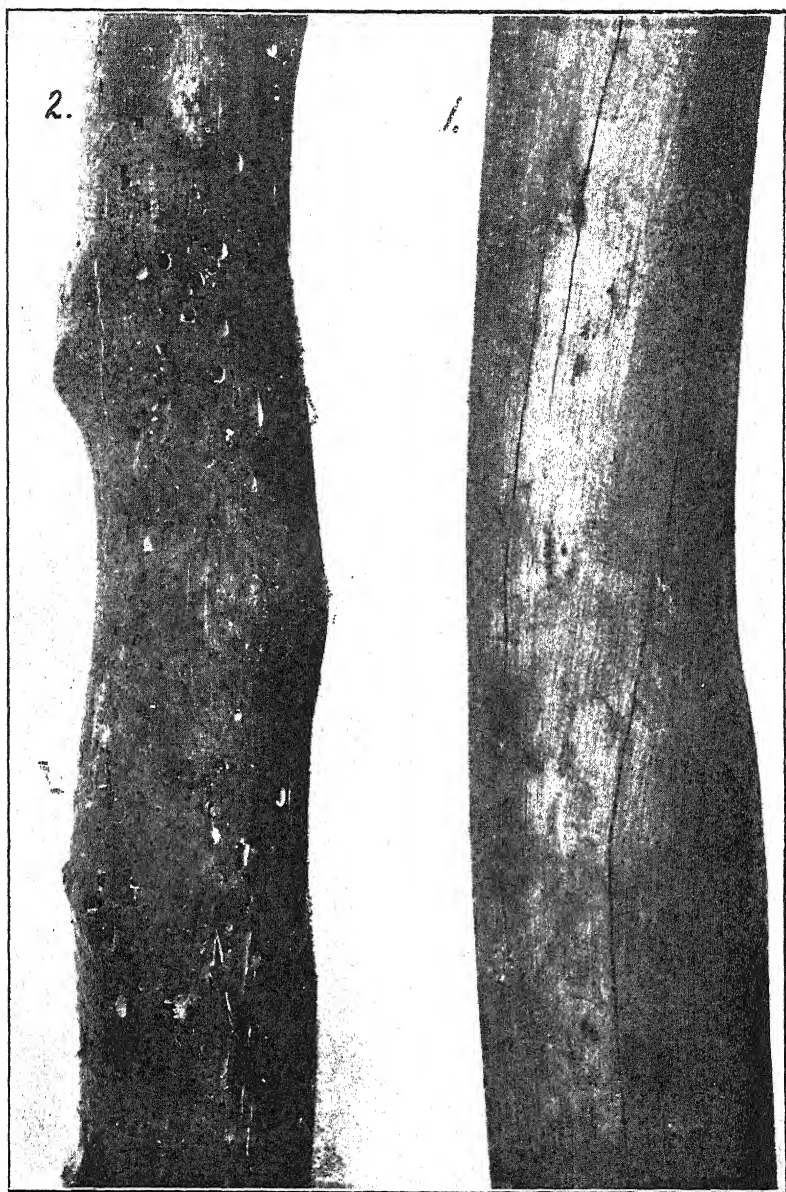


Plate I.

Fig. 1. Section of piece of wood, soaked for 24 hours in 2½ per cent. Arsenite of Soda solution after three years.

Fig. 2. Section of untreated piece of wood after three years.



1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.



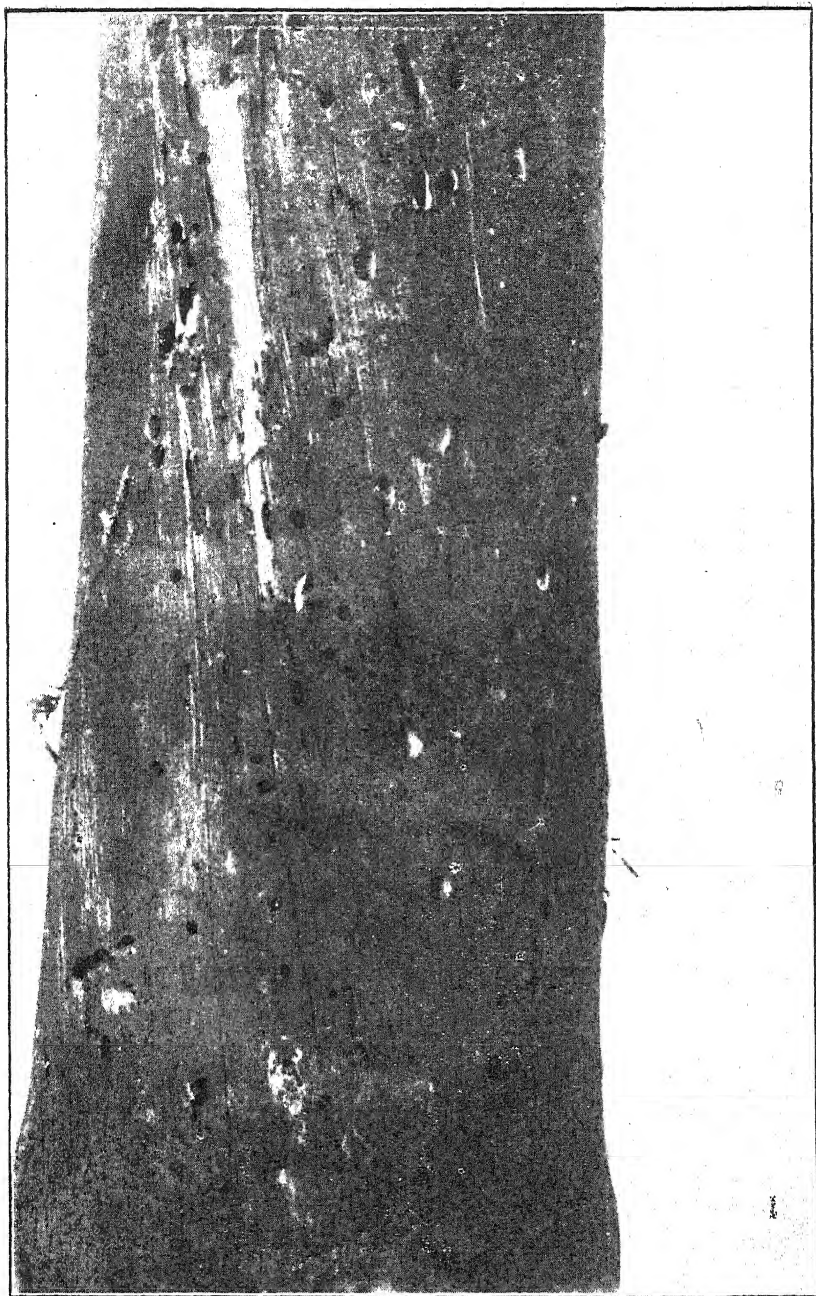


Plate II. Section of piece of wood, soaked eight weeks in water, after three years.

different substances, and then put away in a position which it was judged would favour the attacks of borers. The pieces were actually slung on wires just beneath the iron roof of a mule stable. Msassa wood (*Brachystegia randii*) was used for the experiment.

In order that there might be as little sap as possible in the wood, the trees were cut in mid-winter. They were barked, and laid in the sun to dry. The great bulk of the pieces were cut into three-foot lengths, but as certain preparations were to be used for soaking the timber and large vessels were not available, the wood for this purpose was cut into one-foot lengths. Four of these one-foot lengths were bound with wire to a three-foot untreated piece, and, to avoid any chance of erroneous conclusions through the shortness of the pieces affecting the results, exactly similar untreated pieces were fixed in the same way to act as controls. The experiment was slow in yielding results, but once the borers obtained a start they went ahead very rapidly, and a recent examination of the timbers shewed very decided contrasts, furnishing information of considerable value, which is here given to the public. The timber was treated in August, 1910, and the last observation was made in May, 1913.

(1) *Arsenical Solutions*.—Timber soaked, and in each case four one-foot length pieces bound to a three-foot control piece.

| Chemical. | Strength. | No. of
Hours
Soaked. | Result. |
|---------------------------|-------------------|----------------------------|--|
| a. Sodium Arsenite | 2½ lbs.—10 galls. | 24 | Control badly bored : treated pieces not. |
| b. " " | " " | 68 | Neither control nor treated pieces bored. |
| c. " " | 5 lbs.—10 galls. | 24 | Control much bored : treated pieces not. |
| d. " " | " " | 68 | Control badly bored : treated pieces not. |
| e. " " | 10 lbs.—10 galls. | 24 | Few holes in control ; none in treated pieces. |
| f. " " | " " | 68 | Control riddled : treated pieces not bored. |
| g. Cooper's Sheep
Dip. | 1 pkt.—25 galls. | 24 | Control bored : one hole in one treated piece. |
| h. " " | " " | 68 | Control badly bored : three treated pieces slightly bored. |

(2) *Carbolic Solutions*.—Timber treated as under (1).

| Chemical. | Strength. | No. of Hours Soaked. | Result. |
|-----------------------|------------|----------------------|---|
| a. Jeyes' Fluid - | 1—100 - - | 24 | Control badly bored: one hole in one treated piece, others untouched. |
| b. " - | 1—10 - - | 24 | All pieces badly bored. |
| c. { Crude Carbolic - | 6·4 ozs. } | 24 | Control nearly powdered: all pieces badly bored. |
| { Caustic Soda - | 1 oz. } | | |
| { Water - | 4 galls. } | | |
| d. { Crude Carbolic - | 64 ozs. } | 24 | Control riddled: three treated pieces bored and one not. |
| { Caustic Soda - | 1 oz. } | | |
| { Water - | 4 galls. } | | |

(3) *Coal Tar and Petroleum Derivatives*.—Applied with brush. Two three-foot lengths in each case.

| Chemical. | Temp. | No. of Coats. | Result. |
|---------------------|-------|---------------|--|
| a. Coal Tar - | cold | 2 | One hole in one piece, other untouched |
| b. " - | 180°F | 2 | Two holes in each piece |
| c. Stockholm Tar - | cold | 2 | One piece riddled and other badly bored |
| d. " - | 180°F | 2 | One piece badly bored and one with one hole. |
| e. Jeyes' Fluid - | 180°F | 2 | About 20 holes in one piece: other missing. |
| f. Crude Carbolic - | 180°F | 2 | One piece riddled and one missing. |
| g. Carbolineum - | cold | 2 | One piece shews one hole: other not bored. |
| h. " - | 180°F | 2 | One piece riddled and one badly bored. |
| i. Solignum - | cold | 2 | One piece riddled and one missing. |
| j. " - | 180°F | 2 | One piece riddled and one missing. |

(4) *Paints and Varnishes*.—Applied with brush. Two three-foot lengths in each case.

| Chemical. | No. of Coats. | Result. |
|--------------------------|---------------|---|
| a. White Lead - | 1 | One piece badly bored and one missing. |
| b. " - | 2 | One piece riddled and one missing. |
| c. Red Lead - | 1 | Both pieces riddled. |
| d. " - | 2 | Both pieces riddled. |
| e. { Red Lead, 4ozs. - | 2 | One piece riddled and one with a few holes. |
| { White Arsenic, 1 oz. - | | |
| f. Sapolin (Varnish) - | 1 | One piece slightly bored: other with three holes. |
| g. " - | 2 | Neither piece bored. |

(5) *Pure Water and Brine Soaking.*—Two three-foot lengths in each case.

| | Strength. | Time Soaked. | Result. |
|------------|-------------------|--------------|-------------------|
| a. Water - | — | 4 weeks - - | Both badly bored. |
| b. " - | — | 8 weeks - - | Both riddled. |
| c. Brine - | 2½ lbs.—10 galls. | 4 weeks - - | Both riddled. |
| d. " - | " " | 8 weeks - - | Both badly bored. |

(6) *Controls.*—Six three-foot lengths were set aside as controls. Three of these were missing at the last inspection, and one was riddled and two badly bored. Four one-foot lengths were also tied to a three-foot piece, and all were riddled.

The above results are almost similar to those obtained in the Transvaal from experiments to find a method of treating timber to protect it from "white ant" attack. Arsenical solutions above a certain strength are evidently effective, whilst of the rest, none afford complete protection, coal tar being apparently the best. The fact of the pieces treated with varnish not being much attacked can be ignored, as the writer has seen poles thoroughly dressed with carbolineum and varnished over bored very badly indeed. Where the timber is protected from the rain, soaking in a solution of Arsenite of Soda should be all that is necessary to keep borers out, but a coating of hot coal tar should be added when the timber is exposed to the weather. The same treatment renders the wood also proof against Termites or "white ants."

The treatment is inexpensive, as Sodium Arsenite costs only about 9d. per lb., whilst Coal Tar can be bought in a five-gallon drum for about 15s., or in a one-gallon drum for 3s. 6d. A single gallon will cover a number of straining posts or beams, and on farms where mopani poles are not procurable, the adoption of this method of preserving native wood should save considerable outlay where any construction work requiring timber is being carried out.

The application of solutions of arsenic to timbers intended for use within the walls of dwellings cannot be recommended,

for, although the ventilation is usually so good in the primitive dwellings for which native timber would be used that no harm would probably result, it has been demonstrated that constant inhalation of fumes of arsenic, as given off by wall papers coloured with Arsenite of Copper and Paris Green, is deleterious to health. Therefore, one is inclined towards the safe side. Whether a coating of varnish over the treated poles would prevent the production of fumes or not is an open question, and one that would be difficult to settle satisfactorily. For such dwellings, coal tar alone can be used, and will repay its cost a hundredfold, if only in the prevention of the dust produced by the borers in the rafters, which is quite a serious nuisance, as all who have lived in dwellings roofed with native timber will testify. Coal tar may not look as attractive as stain and varnish, but it is not objectionable at all on the cross-beams, whilst the "uprights" are usually covered with "daga," and so hidden. For implement sheds, outbuildings, fence posts, cattle kraals, gates, cattle-dip crushes and pens, and for any other purpose for which native wood is suitable and durability is desired, it is recommended to soak in a solution of Arsenite of Soda, and to coat with hot coal tar. It is important that the timber be thoroughly dried before each treatment to admit of the maximum penetration of the preparation used. In the experiment, it is probable that the wood was not dried as thoroughly as desirable.

Shortly after the above notes were written, the writer visited the farm of Mr. White, at Thaba's Induna, near Bulawayo. Mr. White had conducted an experiment in treating tobacco sticks against borers by throwing the sticks into his cattle dipping tank filled with the five-day dip according to the Laboratory formula, and leaving them there for a week. The sticks already contained borers at the time they were treated, but the damage was instantly stopped, and the wood was not re-attacked. Untreated poles kept in the same building were riddled. This is a very valuable observation, because the chief difficulty in treating timber lies in the trouble and expense of providing a suitable receptacle in which to soak it. The use of the cattle dipping tank obviates this on farms where such is available. The formula for the five-day Laboratory dip is:—

Arsenite of Soda, 8 lbs.

Soft Soap, $5\frac{1}{2}$ lbs.

Paraffin, 2 gallons.

to make 400 gallons of dip.

According to an analysis of a sample of Cooper's Sheep Dipping Powder, made by the Agricultural Chemist, the five-day Laboratory dip is rather stronger in soluble arsenic than Cooper's Sheep Dip at one packet in 25 gallons. The lack of complete protection from treatment with the latter may, therefore, be due to insufficient arsenic, or that combined with the fact that the wood treated was not dried thoroughly enough. The Laboratory dip at five-day strength, however, seems sufficiently strong for practical purposes, and doubtless Messrs. Cooper and Nephews' preparation for the same purpose would have a similar effect.

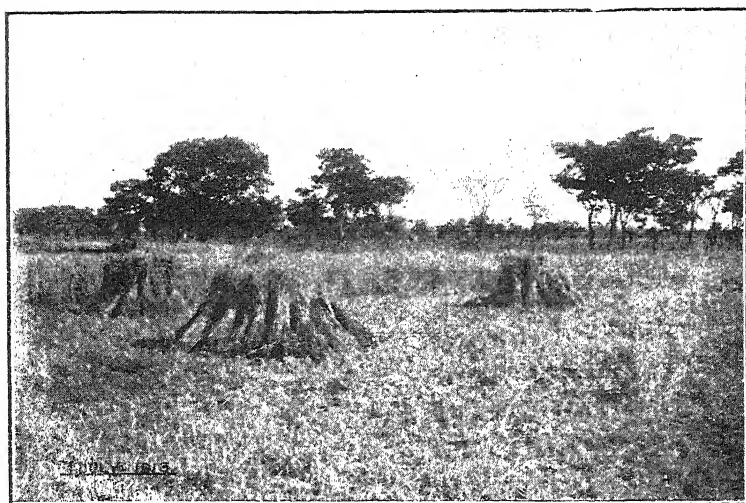
Victoria Wheat.

By J. A. T. WALTERS, B.A., Assistant Agriculturist.

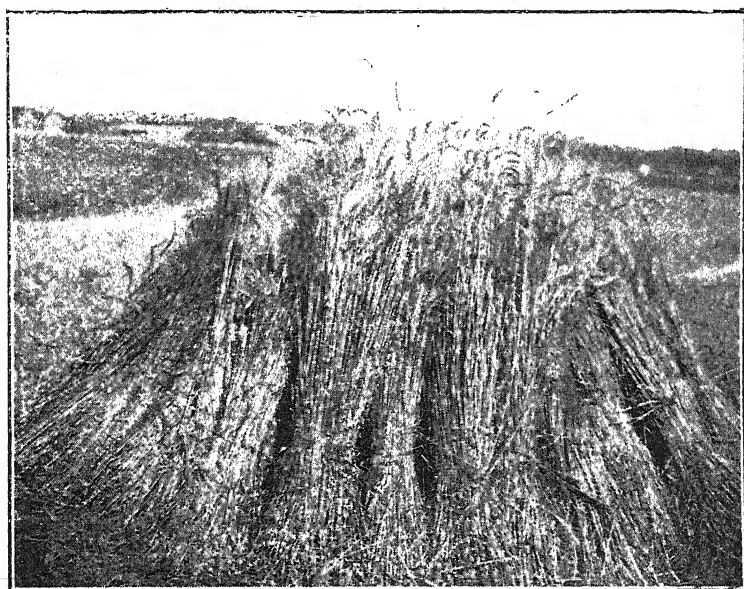
The question of rust resistance in wheat is one which has engaged the attention of agriculturists and plant breeders throughout the world. Wheat rust (*Puccinia graminis*) would appear to be endemic to all parts of the world, with the result that where the pest cannot be controlled, wheat growing is practically impossible.

The attempts to breed a wheat that would be perfectly immune to the attacks of rust have up to now been unsuccessful, but a large number of varieties have been produced by breeding and selection which are highly resistant to this pest. The breeding and selection experiments conducted by the Division of Agriculture and Botany have shewn that wheats resistant to rust in India, Australia, or Europe are not necessarily resistant in Rhodesia. Among the very large number of wheats tried at the Botanical Experiment Station, Salisbury, only a few have proved to be of value on account of their rust resistance, and, therefore, of any use as a summer crop to the Rhodesian farmer. And of these few, Victoria wheat has up to the present been the best.

Victoria wheat is one of the soft varieties of wheats, and the ears are characterised by the long irregularly spreading beards, and the seed which lies loose in the husk and is apt to shed rather freely when ripe. The grain is small in size, and of a dark colour. Its gluten content is rather low, and the milling quality is not very high. But this wheat has the great advantage of being able successfully to withstand the attacks of rust, even in seasons the most favourable to the disease. Victoria wheat has been under close observation at the Botanical Experiment Station for a number of years, and the last season was the fourth in which careful notes were made of its behaviour



Victoria Wheat, Experiment Station, Salisbury. One-acre block.



Victoria Wheat, Experiment Station, Salisbury.

as a summer crop. It was sown in eight separate quarter-acre plots, at different periods, ranging from 16th December to 22nd January, and under different conditions in each case. It was tried with and without manure; on old and on newly broken lands; and as a rotation after maize, sweet potatoes (two years), rice, and pumpkins (manured). The results in each case are given below. In addition to these experiments in Salisbury, this wheat has been grown by farmers in various parts of the country; not always successfully, but in few or no cases was failure due to the attacks of rust. The failures reported were due either to the attacks of insects or to adverse weather conditions. When successfully grown, some of the returns were unexpectedly high, as our results up to date do not indicate more than an average of a little under three bags per acre. The market price of wheat fluctuates greatly, with an average near 30s. per bag. It must also be remembered that the growing of wheat is a much simpler matter than the growing of maize, and that wheat forms a valuable rotation crop with almost any other. The demand for a summer wheat in Rhodesia is very real, and in view of the results obtained, there is no doubt that Victoria wheat, in spite of its drawbacks, can safely be recommended for this purpose. Our experiments have shewn that it is by no means the only variety that yields a fair crop of grain, and it is possible that it may be replaced in the future by varieties better in some respects. Nor is it claimed that it is rust-proof. The leaves and occasionally the stems are attacked, but the plant seems to be able to throw off the infection before enough damage is done to affect the resulting grain.

New Lands v. Old Lands.—The new lands were broken up for the first time in 1912, and sown to Victoria wheat in December and January. No manure was applied:—

| | |
|------------------------|--------------------|
| New lands (two plots) | 548 lbs. per acre. |
| Old lands (four plots) | 834 „ „ „ |

Effects of Manuring on New Lands.—Double complete “Safco” was applied at the rate of 200 lbs. per acre. Seed sown 3rd January, 1913:—

| | |
|----------------|--------------------------|
| Manured plot | ... 1,027 lbs. per acre. |
| Unmanured plot | ... 596 „ „ „ |

Increase due to manuring 431 „ „ „

The manured plot shewed greater vigour throughout, and matured far earlier than the other, being ripe about the third week in May.

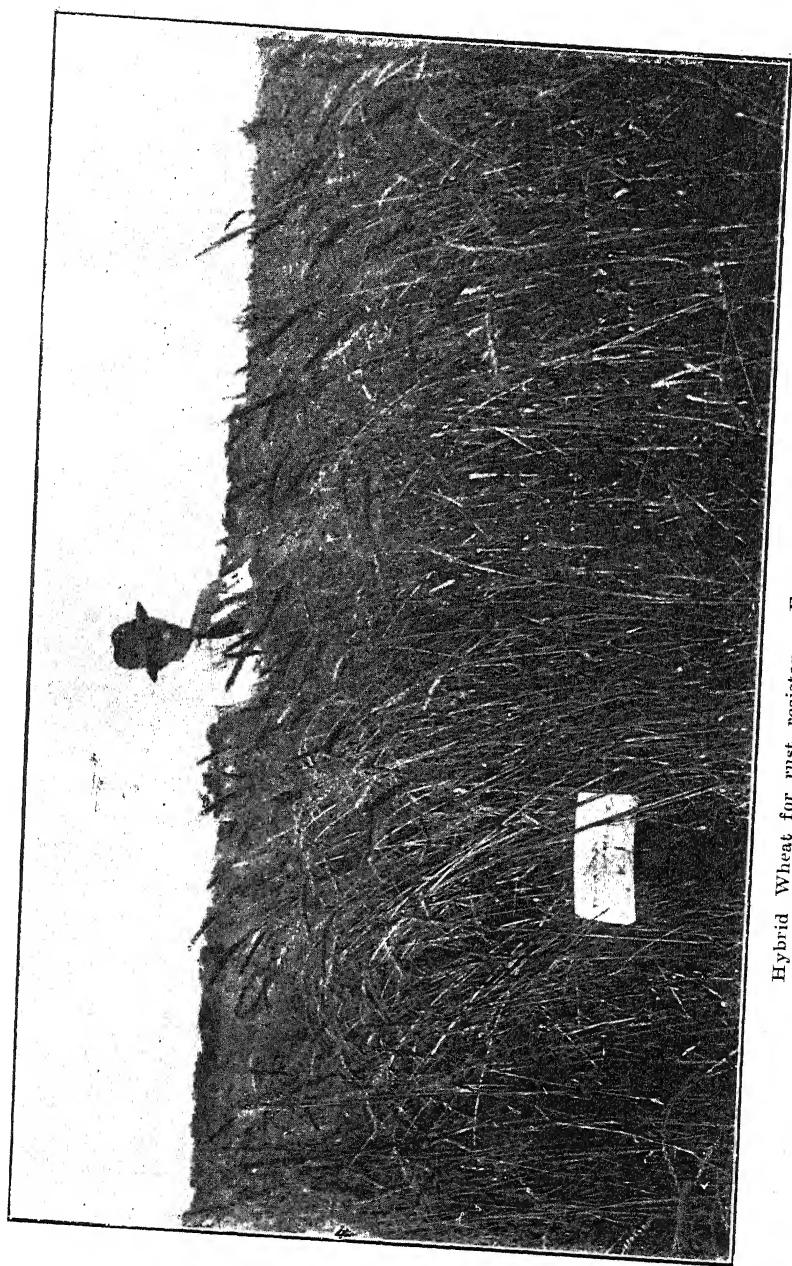
Effects of Previous Crop.—

| | |
|--------------------|-----------------------------------|
| After Maize | 178 lbs. per $\frac{1}{4}$ -acre. |
| „ Sweet Potatoes | |
| (two years) | 151 „ „ „ |
| „ Rice | 280 „ „ „ |
| „ Pumpkins | |
| (manured) | 225 „ „ „ |

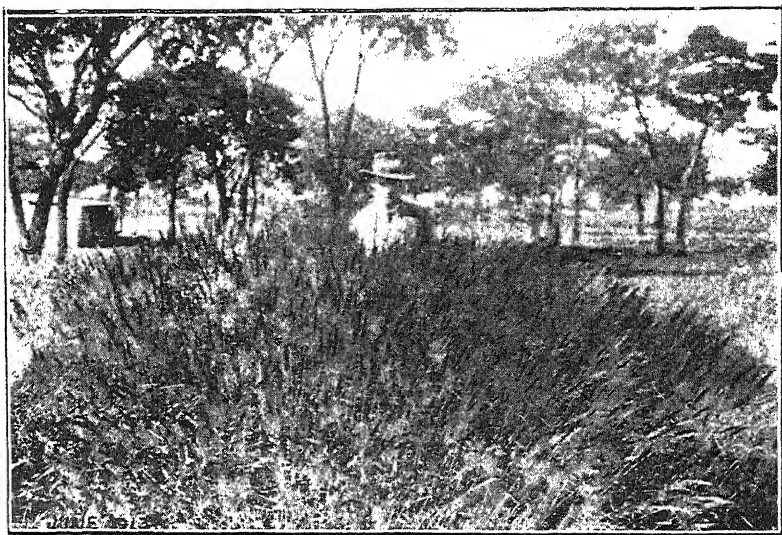
The rice crop the previous year was a failure, perhaps owing to the drought, and the whole crop was ploughed in. This yield is distinctly good. The total yield off this acre block, the photograph of which accompanies this article, is therefore 834 lbs.

*Average Yield (Eight Plots).—*The total yield of grain from the eight plots, making in all exactly two acres, was 1,448 lbs., or an average yield of over $3\frac{1}{2}$ bags per acre. This includes one plot which only gave at the rate of 332 lbs. per acre, and which lowered the average considerably.

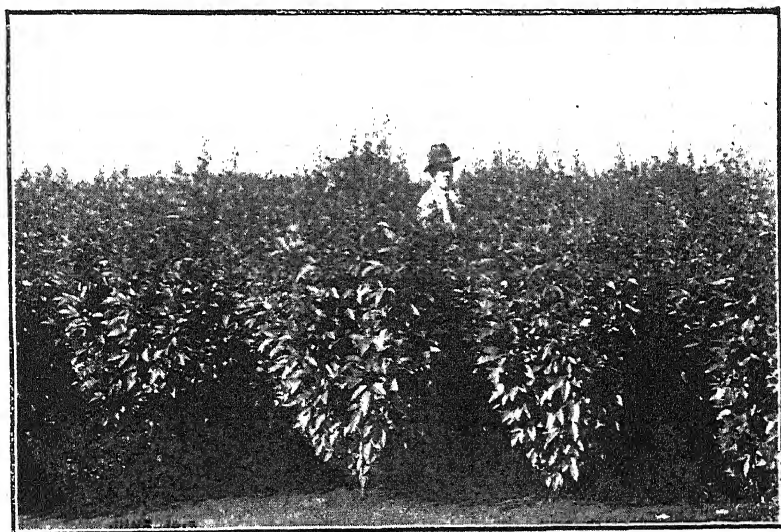
The principal conclusion to be drawn from these figures is the utility of Victoria wheat as a summer crop, proved in a season so extremely favourable to rust that all the oat varieties were entirely destroyed. The yield of three bags per acre on unmanured new land came as a surprise, as also did the amount of increase resulting from an application of 200 lbs. of "Safco" per acre. The result from the plot in which rice had been ploughed in would seem to indicate the value of the ploughed stubble of such crops as Boer Manna or Teff Grass. Indeed, one of the principal values of the crop will be the advantage of including it in any system of rotation that the Rhodesian farmer may adopt.



Hybrid Wheat for rust resistance, Experiment Station, Salisbury.



Molasses Grass, Experiment Station, Salisbury.



Dhal (*Cajanus indicus*), June, 1913.

New Crops for Rhodesia.

RESULTS OF EXPERIMENTS.

By J. A. T. WALTERS, B.A., Assistant Agriculturist.

The 1912-13 season was exceedingly favourable for most crops, both on account of the quantity and of the distribution of the rainfall. In no case has the failure of a crop been due to the atmospheric conditions. This very state of things, however, produced a condition exceedingly favourable to rust, the effect of which was only too plainly marked on the cereal crops. The oats in particular, of which 15 varieties were tried, failed entirely to come to maturity through this cause, and had to be cut for hay before seed heads were formed. The barley, rye, and imported Australian wheats also suffered heavily from rust. In this connection it may be interesting to quote the reply received from the Plant Pathologist of the Union Department of Agriculture to a query as to the danger or otherwise of feeding rusted straw of oats or wheats:—

“ I am not aware of evil effects being reported in the case of the rust fungi. In fact, analyses that have been made of rusted and rust-free wheat shew that the rusted straw is much richer in crude protein, and, therefore, much superior in feeding value to rust-free straw.

“ Further, rusted straw has a higher percentage of fat than rust-free straw, which is additional evidence in its favour.”

It is to be feared that the varieties of oats, barley, and rye now grown in this country are by no means immune to severe

attacks of rust when grown as summer crops. With wheat the case is different, and it is with pleasure that we record an excellent return from Victoria, Bishop, Yellow Cross, and Nlargius wheats in a season so favourable to rust. These have been under observation for several years, and are certain to become prominent in the next few years.

LINSEED VARIETIES.—The season was favourable for this crop, and the seed sown germinated well. The young plants were attacked by a pest—probably cutworms—which accounted for about 20 per cent. of the plants. The remaining plants did well, and a yield varying from 200 to 380 lbs. per acre was obtained from the four varieties. This yield is rather on the light side, but this is a crop which will pay any farmer to grow on a small scale for his own needs, and the demand for linseed for calf feed and the like was so great last season that the seed was unobtainable at the beginning of this year.

BUCKWHEAT VARIETIES.—This is another of the smaller crops which will pay handsomely for the growing. It is one of the fastest growing crops, and matures seed in ten weeks' time from the date of sowing. It was sown on the 7th January, after the main crops were in, and was ready for cutting in the middle of March. The common variety yielded at the rate of over ten bags to the acre. The grain is not used here for human consumption as in America, but it should be remembered that it can be fed to all animals, and that it is particularly recommended as a chicken food, and that it will grow better in poorer soils than almost any other crop.

MELONS.—In spite of very good leaf growth, the total yield of melons did not come up to that obtained the previous season—1911-12—which was a comparatively dry one. The weights obtained were as follows:—

| | |
|-------------------------|---------------------------------|
| Majorda melon | 12 $\frac{1}{4}$ tons per acre. |
| Long green kafir | 8 $\frac{1}{2}$ tons per acre. |

These are distinct varieties, the former being the melon most generally grown in Rhodesia. The general type of this variety would seem to be the roundish form, with a light or dark green skin and a mottled surface. The long green kafir variety is round and long in shape, light or dark green skin,

and with little or no mottling. At the Bulawayo Show both varieties were shewn as Amajoda melons, but in view of the fact that the long green kafir melon is an old-established variety, an attempt should be made to keep the varieties distinct on the above lines. As they cross readily, any number of intermediate forms will, of course, always be found.

BEANS.—It is a well-known fact in agriculture that lands rich in humus tend to the production of leaf rather than grain in beans, and cause them to mature later. This was demonstrated rather remarkably with this year's crop grown on land manured the previous season with six tons of dung. The figures shew this year's and last year's crop, average for three varieties:—

| | Yield
per acre. | Period of
maturity. | |
|---------|--------------------|------------------------|--|
| 1911-12 | 720 lbs. | 79 days | Land not manured. |
| 1912-13 | 414 lbs. | 120 days | Land manured with
6 tons dung the pre-
vious season. |

The varieties tried were White Haricot, Red and White Canadian Wonder, and Natal Sugar. The last variety is a consistently lower cropper than the other three.

DHAL (*Cajanus indicus*).—This plot has been the admiration of every visitor to the Botanical Experiment Station this season. It is a bean of Indian origin, and used largely in India and in Central and East Africa for human consumption. Every part of the plant has its use. It can be cut at any stage as fodder; the beans may be gathered in the green stage and utilised as green peas, or they may be allowed to ripen and be used as human or cattle food. In addition, nitrogen-bearing nodules are formed on the roots. At the time of writing (1st July) the beans are not ripe, although sown early in December, but a few degrees of frost do not seem to have affected the plants in any way. The pods are so numerous, and the plants so healthy and vigorous, that the crop promises to be a record one. The plants stand between six and seven feet high, and last more than one year.

PASTURE GRASSES AND PLANTS.—The grass which gave most promise of general utility has undoubtedly been Napier's

Fodder. This is dealt with in a separate article in this issue. Another native grass of great promise when planted out in the same way is Guinea grass (*Panicum maximum*). This grass is a perennial, and makes a growth of eight to ten feet each season. The photograph was taken towards the end of June, when the grass was perfectly green. It is obvious that a few acres of this grass would provide a very considerable quantity of green fodder for the late autumn and early winter months. A few other native grasses were tried, but have not done sufficiently well to warrant mention.

Of imported grasses, *Phalaris bulbosa* deserves special notice. When sown in the usual way, germination is always uneven, and the resulting plants are extremely dissimilar in many respects. This has been observed so often that doubts exist as to the purity of the seed obtained in this country. It has been suggested that the seed imported into South Africa is mixed with that of other species of *Phalaris*, which are useless as winter pasture grasses. Some of the plants are extremely vigorous, stool out well, and stand the dry winter conditions in a remarkable way. Other plants die off on the approach of the dry season, and disappear entirely. It would, therefore, seem that the only satisfactory way of establishing a fairly large, even stand of this grass is to split up the best plants at the end of the first season and transplant them in rows $2\frac{1}{2}$ to 3 ft. apart, with 12 inches between the plants. This was tried with great success at the Botanical Experiment Station. The slips were planted out in March, and by July had stooled out into biggish plants, which kept perfectly green, and will be of enormous value as winter pasture. Tall Fescue, which has done so well in the Union, has only given negative results here. It is such a valuable grass, however, that further trials will be made with it. None of the Rye grasses would seem to be of much use under Rhodesian conditions. The Molasses grass from Brazil made good growth during the summer and spread rapidly. It reaches the period of full maturity late in the summer, and would seem to be a valuable introduction as a hay crop, which can be cut as late as May or June.

Florida Beggar weed is proving particularly useful as an early spring and late autumn feed. It is a perennial leguminous plant, with a feeding value almost equal to lucerne, and with

an extensive and hardy root system. It deserves notice on account of the fact that it conquers the native grasses in a remarkable way, and by its profusion of seeds spreads rapidly. For these reasons it is well worth inclusion in a pasture mixture of any kind taking the place that clovers occupy in English pastures. Japanese Clover (*Lespedeza striata*) shewed wonderful powers of resistance to the intrusion of native grasses, and although only a short plant is spreading rapidly. It was observed that sheep and goats invariably made straight for this when turned to feed on the plots. Bokhara Clover (*Melilotus alba*) came up early and very thickly in the spring from a sowing made the previous season. It promises well both for pasture and as a green manuring plant.

(To be continued.)

Compulsory Dipping.

By J. M. SINCLAIR, M.R.C.V.S., Chief Veterinary Surgeon.

The following address was delivered by Mr. J. M. Sinclair at a recent meeting of the Mashonaland Farmers' Association:—

Mr. Sinclair said he proposed referring shortly to the history of African Coast Fever and the methods of treatment, after which he would deal with the question of compulsory dipping. African Coast Fever, continued the speaker, was brought to Beira, Umtali and Salisbury by the same lot of German East Africa cattle in the latter part of 1901. From Umtali and Salisbury it spread all over the country by the transport routes. It was not until 1903 that Professor Koch demonstrated that the disease was new to Rhodesia, and whilst generally affecting cattle concurrently with redwater, was an entirely different affection. Gradually the nature of the disease, and especially its method of transmission were demonstrated by Koch, Lounsbury, Theiler and other workers. But for a considerable period no advance was made in methods of treatment, especially towards saving any cattle when once a herd became infected. The first attempt made in this county to save any animals was in 1905, when we compelled cattle owners on the Bulawayo and Salisbury Commionages to stable newly born calves; these were kept stabled until weaned, when they were put in a wagon and removed to clean veld. By this means a large number of calves were saved, which, had they been allowed to graze, would have died. In no case did any of them carry Coast Fever infection with them. This was the first demonstration that it was possible to save cattle on actually infected veld.

The next step was that method known as the temperature camp, first practised by the Natal Veterinary Department. The

infected herd was temperatured and all animals shewing a fever reaction were destroyed; the remainder were then moved to a selected area on veld free, or thought to be free, from infection, and thereafter they were temperatured daily for three or four weeks. Any animal shewing a rise of temperature was destroyed. Spraying or, where a tank was available, dipping was practised, but was not essential to the success of the method. This method of freeing a herd from disease was practised with varying success for several years. In some cases the losses were not more than two or three per cent., in others they were very heavy. Frequently it was found that the supposed clean veld to which the cattle had been moved was really infected, and another and in some cases several moves had to be made before the herd was freed from disease. Owing to the increase in the number of cattle in the country, the practice of this method became difficult, and in some cases impossible. It was not easy to obtain suitable clean veld to use as temperature camps without infringing on the rights of others, or on the grazing grounds of healthy herds, and if we had to depend solely on it now it would be impossible in many cases to save even a small percentage in an infected herd. At any rate, by this method, aided by fencing, the disease was held until, in 1910, Watkins-Pitchford published the results of his investigations into dipping as a means of combating Coast Fever. Whilst giving the other investigators all credit for their brilliant researches into the nature of the disease and methods of transmission, Mr. Sinclair thought that the results of Watkins-Pitchford's labours had been of greater and more practical value to the South African farmer generally. Not only had his three-day dipping solved the Coast Fever problem, but it had demonstrated that dipping is a most effective prevention of other diseases, such as white fever, liver disease, etc., in calves.

In 1902-03 the disease spread all over the Salisbury district. Very few cattle owners escaped, and in most cases only a small percentage, ranging from two or three to ten, survived. When he first came to Salisbury in 1904 there were very few cattle in the district, but infection was kept up by calves born from salted parents. Accurate records of the farms actually infected up to the end of 1905 are not now available. In 1906 the disease occurred at eight centres in the district, including the

commonage. In 1907-08 and '09 no fresh outbreaks or cases occurred, and the district was regarded as clean, and comparatively free movement of cattle was permitted. In 1910, however, eight outbreaks occurred, beginning with that on the Brickfields, which most of those present remembered. In 1911 two outbreaks occurred, and in 1912 one, and during the present year two, viz., at Mr. Simpson's farm, and on the Hatfield plots. Considering the number of cattle involved during the last three years, the mortality from Coast Fever had been very small, but the indirect loss, *i.e.*, the interference with ordinary cattle trade and farming operations had been very considerable. But apart from this, these yearly recurrences of the disease were most disconcerting, and cattle owners might well ask if they would ever eradicate Coast Fever. Well, he thought they would, but they could only do so by the more general practice of dipping. The more persistent their attacks on the carrier of the disease, the tick, the less the danger of the disease spreading, and the smaller the loss should it break out in any herd. They had a good example in Salisbury of the efficacy of dipping in suppressing the disease, and in preventing its spread. As they knew, an outbreak occurred in Mr. Young's herd in February last year. Weekly dipping of all the cattle on the commonage had been in force for some time previous to the outbreak, and immediately it occurred the three-day interval was adopted. One more case occurred in June. Since then there had been no cases on the commonage. It should be noted that the infected herd was not removed from the ordinary grazing ground, *i.e.*, the infected area. Now, without the three-day dipping, the loss would have been hundreds, as there are upwards of 2,000 head on the commonage and Avondale. It may be said, of course, that dipping did not prevent the spread of infection to the Grange and Hatfield. Well, he doubted very much if these outbreaks originated from the commonage. He believed they were due to a latent infection, a form of the disease of which as yet nothing was known. One thing his experience of the past few years led him to conclude, *viz.*, that Coast Fever infection can persist or remain dormant for a much longer period than was formerly considered possible.

Now the question was, how were they to deal with this state of things, *i.e.*, what were they to do to prevent these almost

yearly recurrences of infection? He did not think any of them would disagree when he said, by more regular and more extensive dipping; that is, dipping over a larger area than they were at present. During the last eight or nine years there had been no Coast Fever outside a radius of 14 miles of Salisbury, and he thought that if all cattle within 20 miles were regularly dipped they would soon eradicate the disease in the district. Anyhow, it was the only reasonably practical means at their disposal at present. Compulsory dipping, even in such a comparatively small area, was a much larger question than appeared at first sight. There were difficulties in the way, but none of these were unsurmountable. The first was the provision of tanks. There were a good many tanks in the district, and it did not follow that if compulsory dipping were enforced every cattle owner would have to erect a tank. In many cases one tank could be made to serve several owners, if they would only put their heads together and work amicably. The cost, he knew, was a serious item, but it was only an insurance. One could easily lose in a week or two cattle the value of which would easily pay for a tank. The next difficulty was that of supervision. If they had to supervise the dipping of every lot of cattle within, say, a radius of 20 miles of Salisbury, he estimated that they would require ten cattle inspectors in addition to the present staff. He thought about 100 tanks would be in use, and he was allowing one man to every ten tanks. The cost of this was prohibitive, but he did not think it was necessary. Occasional inspections to see that the cattle were free, or fairly free, from ticks, and that the tank was in working order, was all that would be required in most cases. They would soon get to know where regular inspection was required. In this matter, as in many others with which the Veterinary Department was connected, if they did not receive the assistance of the farmers they could not expect to carry it through successfully; and he was sure if more extensive dipping was agreed upon they would, by joint action, be able to accomplish their object.

There was another difficulty which, however, could easily be avoided; *viz.* the keeping of the fluid in the tanks at or near its proper strength. If the depth of fluid in the tank was carefully measured after each dipping and before the next, and water or dip added as required, there should be no trouble.

But, unfortunately, they had, in several cases where owners were compelled to dip their cattle, found that they had apparently kept on adding water and no dip until there was only a trace of arsenic in the tank. There was no excuse for this. But it was a part of dipping operations which obviously the Veterinary Department could not deal with. Of course, dip could be analysed, but with several hundred tanks in the country a special staff would be required to make periodical analyses. But he did not consider this necessary. The careful, observant man would very soon see if the dip was not strong enough to have the desired effect on the ticks, or if it was so strong as to cause scalding. There was no danger of gradually getting the solution to a dangerous strength if ordinary care was used. If thought to be too weak or too strong, an analysis could then be made. Another difficulty was that people erect tanks and do not use them. Of course, they were the people who required looking after.

He was frequently asked how often dipping should be practised. He would say that in the tick season not less than once in seven days. In the winter months the period may be extended to 14 days, or may be discontinued altogether. Fortnightly dipping as a prevention of Coast Fever was of little use, as the Coast Fever ticks only remained on their hosts for three or four days, therefore, only one crop in every three or four was caught. There was another point. He had referred so far to the dipping of cattle only, but he thought where small stock were carried on a farm it was just as necessary to dip them as it was to dip the cattle. On a farm he visited the other day, the heads and necks of the goats were covered with black and brown ticks.

An interesting discussion followed, and several points of importance were raised. With regard to the powers conferred by the Ordinance for enforcing the dipping of stock, Mr. Sinclair pointed out that in any area where disease existed the Administrator could compel the erection of dipping tanks, the cost to be recovered and repaid as in the case of compulsory fencing. Also in any clean area to which infection might probably extend, dipping could be made compulsory by the Administrator under the general powers conferred by the Animals Diseases Consolidation Ordinance. But in clean

areas far removed from disease and to which it was unlikely that disease would spread, it was doubtful if the Administrator would act without further and more direct legislative authority. He thought, however, if there was a general desire for this precautionary measure there would be no difficulty in obtaining the necessary power.

He further explained that no machinery existed whereby a majority of cattle owners in any given area could petition for compulsory dipping, as obtained for fencing under the Fencing Ordinance. He also expressed the views that in most cases the ox transport areas would be the most convenient unit for dipping purposes, and that where owners representing half the number of cattle in any area requested the enforcement of dipping, their request should be given effect to.

The Port Elizabeth Tractor and Plough Trials.

The following is the report of the judges at the recent tractor and plough trials held at Port Elizabeth :—

FIELD TRIAL COMPETITIONS FOR FARM TRACTORS, 1913.

Before recording our awards in connection with the above trials, we consider it advisable to refer briefly to the procedure adopted at the trials.

The trials were held at Perseverance on Wednesday, March 26, and following days, on land lying to the east of the Port Elizabeth-Uitenhage Railway, measuring 575 by 205 yards, which was divided into suitable sized plots. Lots were drawn by the competitors to ascertain their respective sections. On March 26 we inspected the various plants, and gave the competitors an opportunity of pointing out their salient features. On March 27 the plants proceeded in rotation to plough their allotted plots with mould board ploughs. A record of the acreage and time occupied, the fuel and water consumed, and the depth ploughed was taken. A standard depth of 8 in. was decided upon, but owing to the variety of ploughs used, some of which were unable to allow that depth, the records of fuel consumption and time were not readily comparable. That afternoon the same tractors were attached to disc ploughs.

The judging of the ploughs was undertaken by Messrs. N. W. Chandler, W. Rubidge, O. E. G. Evans, and G. White. On March 28 ploughing with disc ploughs was continued, and on its completion all tractors proceeded with a cross-ploughing test over the same area, some drawing disc and others mould board ploughs. An opportunity of shewing the turning radius of their respective plants was also given to all competitors. On March 29, at our request, a further trial of certain selected

plants was held on land to the west of the railway, each tractor drawing the same plough in turn, which was set at a specified depth.

The following tractors competed in the trials:—

- 24 b.h.p. "Ivel" Agricultural Motor, Mangold Bros., Port Elizabeth—£450, less 5 per cent. for cash.
- 30/60 b.h.p. Rumely "Oil Pull," Type "E," Malcomess & Co., Ltd., East London—£925.
- 18/20 b.h.p. "Universal" Tractor, S. Sykes & Co., Ltd., Johannesburg—£375.
- 50 b.h.p. McLaren's "Royal" Steam Tractor, J. & H. McLaren, Leeds, England—£690.
- 15/25 b.h.p. Fairbank's Morse Oil Tractor, Duffet & Koch, Cape Town—£568.
- 30/40 b.h.p. Ransomes' Special Agricultural Steam Tractor, Mangold Bros., Port Elizabeth—£725, less 5 per cent. for cash.
- 30/50/60 b.h.p. Big Four "30" Agricultural Oil Motor Tractor. Self-steering. Emerson-Brantingham Implement Company (Inc.), Rockford, Illinois, U.S.A.; Special South African Representative, Mr. H. D. Dodge, P.O. Box 81, Port Elizabeth—£950.
- 25 b.h.p. "Mogul" Tractor, Wm. Spilhaus & Co., Cape Town—£550.

Early in the trials we realised that we were confronted with a difficult problem in judging the merits of the respective tractors, on account of the variation in power. Owing, however, to the liberality of the Society in placing at our disposal an additional sum of 25 guineas for a special prize, we decided to award this to the most suitable general purpose tractor for use on farms. The comparison between the respective merits of steam and oil tractors must always be a difficult one in this country owing to the proximity or otherwise of the sources of supply of fuel and water. Furthermore, in consequence of the necessary limitations of time and area, which made it impossible to obtain as much scientific data as would be desirable to give an accurate comparison of the economy and comparative merits under the varying conditions prevailing in the Midlands, we realised that only time can prove whether internal combustion or steam engines are best suited to individual requirements.

The storage of oil in bulk as opposed to the present system of supply in small cases, and a fall in the price of liquid fuel might materially alter the respective merits at an early date.. Taking the tractors as shewn, we have unanimously decided to award the prize of £100 to J. & H. McLaren, Leeds, England, for their 50 b.h.p. "Royal" steam tractor, priced at £690, and a special prize of 25 guineas to Messrs. Sykes & Co., Ltd., Johannesburg, for their 18-20 b.h.p. "Universal" tractor, priced at £375.

The following information with reference to the winning tractors may be of interest:—

| | McLAREN. | SYKES. |
|-----------------------------|----------------------|---|
| Total area ploughed | 2 acres | $\frac{1}{2}$ acre |
| Time per acre | 28 minutes | 1 hour 23 min. |
| Fuel consumed per acre | * 80 lbs. Natal coal | † Petrol 2 pints
Paraffin $3\frac{1}{2}$ gals. |
| Water evaporated per acre | 51½ gals. | Not measured |
| Average depth of ploughing | 8½ inches | 7 inches |
| Radius of turning circle | 16 feet 5 inches | 12 feet |
| Number of bottoms to plough | 8 | 2 |

In making the above awards we would call attention to the outstanding features of (1) the prize-winning tractors, (2) those which we consider merit special notice.

MESSRS. J. & H. McLAREN'S "ROYAL" STEAM TRACTOR.—The remarkably low consumption of fuel was largely due to the provision of a superheater, a feed water heater, and the lagging of the steam cylinders and valve chests, coupled with the fact that the engine was "compound," *i.e.*, steam being passed through two cylinders in place of being passed through one cylinder only. Against these advantages there is a delay due to getting up steam, and the losses incidental thereto if the plant is not worked for a sufficiently long period before withdrawing the fire. The transport of coal and water to the engine will in many cases prove a serious objection to the use of steam plant.

The substantial build and fool-proof construction of the engine appealed to us.

* 80 lbs. Natal Coal.—This includes 1/10th of the amount for raising steam from cold water to 200 lbs. per square inch.

† Petrol, 2 Pints.—Competitors claimed to have spilt some petrol owing to tanks being fuller than usual to meet Judges' requirements. The Steward upholds this, but it was not possible to measure the loss.

THE "UNIVERSAL" OIL TRACTOR.—As a general-purpose paraffin machine we could call attention to the 3-speed travelling gear, the accessibility of all parts, the handiness of the plant, its economy in fuel, its low purchase price, and its mechanical excellence. The manner in which it carried out the various tests, particularly in travelling over the rough ground in the cross-ploughing test, are worthy of notice.

We consider, however, that all gears should be enclosed, and better provision made for cooling the circulating water in this hot climate.

THE "IVEL" AGRICULTURAL MOTOR.—The workmanship of this paraffin machine leaves nothing to be desired, but it is only provided with a one-speed gear and a single road wheel in front, which, in our opinion, is too small in diameter.

We consider that the driving chains should be protected from dust, and better cooling provision for circulating water should be provided. The fuel consumption was low on trial.

THE RUMELY "OIL PULL."—This plant, which weighs 25,800 lbs., as compared with 18,350 in the case of the winning tractor, did excellent work throughout, shewing that it had ample power under all conditions. The engine is enclosed, but much of the gearing is open to dust.

The circulating medium for cooling the cylinders is oil, as opposed to the usual practice of using water; this necessitates the use of water in the fuel to keep down the temperature in the cylinders.

The grip on the ground which this plant shewed under all conditions, and the excellent work of the driver (Mr. Robbins), were much admired by us.

RANSOMES' AGRICULTURAL STEAM TRACTOR.—This tractor, of first-class design and construction, had a single cylinder without superheaters and feed water heater, and, though doing excellent work, was outclassed in fuel consumption.

THE EMERSON-BRANTINGHAM IMPLEMENT COMPANY "BIG FOUR" AGRICULTURAL OIL MOTOR TRACTOR.—This tractor, weighing 18,900 lbs., consuming liquid fuel, has a 4-cylinder engine of a design which it must be difficult to improve upon.

The efficient water-cooling devices which reduce the waste of circulating water to a minimum, the large wheels, and the exceedingly ingenious self-steering device, also the general accessibility of the plant, are features worthy of more than ordinary attention.

We consider that the provision of two speeds in place of the present fast one would add materially to the value of this plant.

THE "MOGUL" TRACTOR.—This paraffin plant went through the whole of its trials in a most satisfactory manner, and proved its reliability when a plant of such weight would suit the conditions. Its somewhat bulky size, compared with its horse-power, made it, in our opinion, unsuitable for general purposes; while on the other hand its somewhat small power, compared with the larger internal combustion engines referred to above, made it difficult to draw comparisons with them.

R. W. NEWMAN,
M.I.C.E., M. INST. MECH. E.
LLEWELLEN J. ROBERTS.
GRAY A. BARBER.

Port Elizabeth,
31st March, 1913.

REPORT ON PLOUGH TRIALS, 1913.

We award first prize to J. & H. McLaren's 8-furrow mould board rigid-framed plough in two sections.

We consider it does good, deep work, throwing an even tilth, giving a clean cut. Its simplicity and easy adjustability are particularly suitable to the requirements of this country with its unskilled labour.

We further consider the lifting out a very simple and suitable arrangement. The guiding arrangement, which enables the plough sections to take shorter turns than the engine, and thus get nearer into the corners of enclosures, is particularly suited to our requirements.

We consider the "Mogul" independent lever 5-furrow mould board plough worthy of special mention. Light and of

first-class design, its special points are that each plough is attached independently by a hinge to the frame, which enables it in working to adapt itself to any inequalities in the ground, a further useful contrivance being an independent release arrangement to prevent breakage from contact with stones, etc.

J. & H. McLaren's 6-furrow digger breast plough is worthy of mention as being extremely strong and suitable for breaking up very hard and rough ground to an unusual depth.

We award first prize to Ransomes, Sims & Jefferies' 6-disc plough. We consider the steering and adjusting arrangements very simple and easy. This plough throws a very fine and uniform tilth, going to a good depth without clogging. The lubricating arrangements are very good.

O. E. G. EVANS.

G. WHITE.

N. W. CHANDLER,

Government Engineer, Elsenburg.

W. RUBIDGE.

Port Elizabeth Trial Grounds,
28th March, 1913.

Reductions in Railway Rates affecting Farmers during period 1st September, 1911, to 30th April, 1913.

| Article. | Station From. | Station To. | New Rate. | Approximate Reduction. |
|--|--|--|---|------------------------|
| Lime and Limestone—full truck loads | Any Station | Any Station | Scale "A" | 1 to 60 p.c. |
| Goods, scales of rates | Any Station—
Lomagundi Branch | Any Station—
Lomagundi Branch | Classes 1 2 3 4
9d 7d 5d 4d
per ton per mile | 10 to 40 p.c. |
| Cement—minimum 10 tons | Beira | Any Station | Class 5 | 15 to 25 p.c. |
| Timber—minimum 10 tons | Beira | All Stations | Tapering Scale | 10 to 20 p.c. |
| Galvanised iron—minimum 10 tons | Beira | All Stations | Tapering Scale | 10 to 25 p.c. |
| Passenger Fares | Any Station—
Blinkwater Branch | Any Station—
Blinkwater Branch | Classes 1 2 3
3d 2d 1d per mile | 33½ p.c. |
| Live Stock and Vehicles | do. | do. | 6s per short truck every
10 miles | 33½ p.c. |
| Grain—minimum 5 tons | do. | do. | 1d per ton per mile | 33½ p.c. |
| Live Stock and Vehicles | Any Station—
Lomagundi Branch | Any Station—
Lomagundi Branch | 6s per short truck every
10 miles | 40 p.c. |
| Wagon Wood—minimum 10 tons | Beira | All Stations | 2d per ton per mile | 60 p.c. |
| Wagon Wood—minimum 10 tons | Vryburg | All Stations | 1½d per ton per mile | 50 p.c. |
| Fertilisers | Beira | All Stations to Gwelo | Tapering Scale | 1 to 25 p.c. |
| Fertilisers | Vryburg | All Stations | Tapering Scale | 1 to 50 p.c. |
| Cement—minimum 10 tons | Vryburg | All Stations | Tapering Scale | 15 to 25 p.c. |
| Coal | Wankie | Congo Border | 5/8ths of 1d per ton per
mile | 37½ p.c. |
| Milk and Cream | Any Station—
Beira-Salisbury Sectn. | Any Station—
Beira-Salisbury Sectn. | Mileage scale for Milk | 25 to 75 p.c. |
| Wool for export | Distances 600 miles & over | Beira or Vryburg | Class 4 | 33½ p.c. |
| Natives | Any Station—Bulawayo—
Broken Hill Section | Any Station—Bulawayo—
Broken Hill Section | 1d per mile up to 120
miles. 120-240 miles
10s. Above 240 miles
½d per head per mile | 1 to 50 p.c. |
| Meat and Fish in cold storage trucks
min. half carrying capacity of truck | Bulawayo | Salisbury | Half class 3 | 50 p.c. |
| Wood for packing fruit | Any Station | Any Station | Class 3 | 20 to 33½ p.c. |
| Trained Native Farm Labourers | Vryburg | All Stations | ½d per head per mile | 33½ p.c. |

Reductions in Railway Rates affecting Farmers during period 1st September, 1911, to 30th April, 1913.

| Article. | Station From. | Station To. | New Rate. | Approximate Reduction. |
|--|---|---|---|--------------------------------|
| Crude Oil for fuel—minimum 10 tons | Beira - | Salisbury, Gwelo, Bulawayo & Livingstonia | Class 5 | 15 to 33½ p.c. |
| Sheep and Cattle Dips | - | - | - | - |
| S.A. Maize, Kafir Grain, Inyouti, Rapoko and Meal | Any Station -
Any Station—Salisbury-Broken Hill section and Branches | Any Station -
Any Station—Salisbury-Broken Hill Section and Branches | Tapering Scale -
Local Agricultural Produce rate (temporary) | 10 to 40 p.c.
50 to 60 p.c. |
| Paraffin, O.R. Candles, Rice, Soap, (toilet excepted) | Beira - | Macquene (inclusive) & stations to Gwelo (exclusive) | Tapering Scale | 1 to 25 p.c. |
| Sugar | Beira - | do. | - | - |
| Flour, including Wheaten, Flour and Boer Meal—minimum 1 ton | Beira - | do. | Tapering Scale | 15 to 50 p.c. |
| Maize | - | - | Tapering Scale | 15 to 50 p.c. |
| Cement for irrigation purposes | Beira - | Salisbury | £2 6s 9d per ton | 40 p.c. |
| Horned Cattle to pasturage | Any Station -
Stations in Matabeleland | Any Station -
Any Station | Half class 3
Half rate to cover forward and return journey (temporarily) | 50 p.c.
75 p.c. |
| Crude Oil for fuel—minimum 10 tons | Beira - | Mazabuka | Class 5 | 36 p.c. |
| Imported Maize | Beira and Vryburg | Any Station | Local produce rate (temporarily) | 50 to 60 p.c. |
| Hay in bales, full truck loads—minimum 40th carrying capacity of truck | Salisbury | Bulawayo | £2 0s 2d (temporarily) | 25 p.c. |
| Salt for stock feeding | Bulawayo | Salisbury & intervening Stations | 1d per ton per mile | 33½ p.c. |
| Salt for stock feeding | Beira - | All Stations beyond Umfali | Tapering Scale - | 5 to 33½ p.c. |
| Arsenite of Soda for dipping purposes | Any Station | Any Station | Tapering Scale (same as dip) | 20 to 75 p.c. |
| Fertilisers—minimum 1 ton | Beira and Vryburg | Any Station | Up to 480 miles 2d per ton per mile, maximum £2; 481 miles and over 1d per ton per mile | 15 p.c. |

Reductions in Railway Rates affecting Farmers during period 1st September, 1911, to 30th April, 1913.

| Article. | Station From. | Station To. | New Rate. | Approximate Reduction. |
|---|---|---|-----------------------------|------------------------|
| Petrol and Paraffin Tractors for ploughing | Any Station | Any Station | Agricultural Implement rate | 50 p.c. |
| Offcake for cattle feeding—minimum 5 tons | Beira and Vryburg | All Stations | Class 4 (temporarily) | 33½ p.c. |
| Hay—minimum 400lbs carrying capacity of truck | Hartley | Bulawayo | £1 14s 8d per ton | 12½ p.c. |
| Do. | Gadzema | Bulawayo | £1 15s 0d per ton | 12½ p.c. |
| Do. | Makwiro | Bulawayo | £1 16s 6d per ton | 18 p.c. |
| Do. | Norton Siding | Bulawayo | £1 17s 6d per ton | 23 p.c. |
| Do. | Livingstone | Bulawayo | £1 18s 3d per ton | 20 p.c. |
| Passenger Fares | Any Station — Blunkwater, Lomagundi, Shamva and Congo | Any Station — Blinkwater, Lomagundi, Shamva and Congo | Tapering Scale | 1 to 25 p.c. |
| Parcels and Excess Luggage | Border Sections excepted | Border Sections excepted | Revised Scale | 1 to 25 p.c. |

The Agricultural Outlook.

20TH JULY, 1913.

Prognostications regarding the mealie harvest in Mashonaland appear to be verified, and the crop in most districts is reported as being a satisfactory one. Winter crops are said to be doing well, and there is every prospect of good yields. Stock is generally in good condition, and remarkably free from disease. In most districts there is ample grazing, and sufficient to carry over the dry season. Warnings have been issued everywhere to natives not to burn grass, and the effect of the new law on this subject will be watched with interest. In Matabeleland, owing to the very uneven distribution of the rainfall last season, conditions vary considerably. In the Gwelo district the mealie harvest is better than expected. Owing to the drought up to January there is not anything like a full crop, but on the whole farmers are fairly satisfied. Cattle and small stock are free from disease, and are in the best of condition. The mortality in the Gwelo district from horse-sickness has been unusually high this year, but, as in other parts, this can be attributed in a large measure to owners neglecting to take ordinary precautions, two or three favouring seasons apparently lulling them into a false state of security.

In mostly all the other districts of Matabeleland the crops, as expected, are light, exceptions occurring at individual farms. Everywhere stock is reported as being in good condition, and although in the Gwanda district it has been found necessary to remove cattle to better feeding grounds, grazing for the present is fairly good in most parts.

Departmental Correspondence.

Under this heading we publish correspondence between farmers and the Technical Officers attached to the Department of Agriculture, containing points which may be of general interest and assistance to our readers.

UNSHELLED MAIZE IN THE CRIB.

Enquiries having been received as to the number of bags of maize to be obtained from cobs harvested into a crib, the Assistant Agriculturist and Botanist proffers the following information:—

“Estimate the cubic contents of the space occupied by the unshelled cobs in the crib by multiplying the height by the length by the breadth in feet. Multiply this again by two and divide by fifteen. The answer will give approximately the number of bags of maize that will be obtained after shelling.

“For example, if the cobs in the crib occupy a space of 20 ft. long by 8 ft. broad by $7\frac{1}{2}$ ft. high, $20 \times 8 \times 7\frac{1}{2}$ equals 1,200. Multiplied by 2 equals 2,400, divided by 15 equals 160, which is approximately the number of bags of shelled grain that will be obtained. This estimate is based on the fact that $7\frac{1}{2}$ cubic feet of grain on the cob produce one bag of shelled grain.”

Correspondence.

DESTRUCTION OF TREES BY ACID.

To the Editor,

Rhodesia Agricultural Journal.

Sir,

I saw Mr. Skerritt's letter in your last issue *re* tree destruction with acids. Your footnote hits the nail on the head. I have seen many hundreds of acres of bush—large and scrub—completely destroyed with ordinary commercial saltpetre, but the trees were not cut down, as this entails much labour. A hole is bored in the tree in a downward direction to the centre. For large trees, a 1-inch auger is used; for smaller ones, $\frac{1}{2}$ -inch size is large enough. For large trees, one to two ounces is the quantity used, and for smaller ones half to one ounce. A plug is put in the hole to keep rain from washing it out. The nitrate of potash is carried by the sap to the tips of the branches and to the rootlets. If the tree is a large one, say, two feet or more in diameter, very little difference will be noticed in the foliage for two or three months, then the leaves begin to fall, and it assumes a bare, wintry appearance. At the end of about six or eight months you pile a little brushwood round the tree and light it, and there is no further trouble. It will smoulder away to the remote ends of the roots, sometimes thirty feet from the butt of the tree, leaving masses of valuable ash in all directions; while if your bungalow is near to the clearing, you will hear a crash, which will sometimes startle you at night time, when the big trees fall, and when fallen they will continue to smoulder until every particle is converted into ash.

The ploughs are then started, and with the ash and burned soil combined, you have a very rich piece of planting land. This is a common method of clearing tobacco lands in tropical countries. The price of saltpetre should not be a hindrance to its use, as it is a cheap commodity in most countries. Mr. Skerritt will be able to give us definite advice on this point.

Yours, etc.,

C. J. SKETCHLEY.

Waterfall Farm,
Glendale, Mazoe.

Veterinary Report.

May and June, 1913.

SALISBURY.

AFRICAN COAST FEVER.—On the Hatfield Estate the disease appeared amongst two small herds in the immediate vicinity of the originally infected herd. Seven animals were destroyed, and in each case the existence of Coast Fever was determined microscopically.

No fresh cases occurred at the farm Grange and Salisbury Commonage. It is now over twelve months since the last case at the latter centre.

Ten Shorthorn heifers and one Shorthorn bull, imported from England by the B.S.A. Company, arrived in June, and were tested with Tuberculin and subsequently inoculated with Gallsickness and Redwater virus.

IMPORTED PURE-BRED STOCK.—The four Shorthorn bulls and four heifers which were inoculated with Redwater and Gallsickness virus in April all shewed marked reactions. One bull succumbed to Gallsickness, the remainder made satisfactory recoveries.

MALLEIN TEST.—Twenty-eight horses were tested. No reactions.

BULAWAYO.

AFRICAN COAST FEVER.—At the Collaton infected centre, one animal was destroyed. *Post-mortem* examination shewed lesions of Coast Fever. Total number of deaths to date, 431.

MALLEIN TEST.—The following animals were tested with mallein on importation without reaction (includes Gwanda and Plumtree):—Horses, 469; mules, 180; donkeys, 363.

IMPORTATIONS OF CATTLE AND SMALL STOCK.—Bulls, 151; heifers, 853; sheep and goats, 4,827. This includes 25 head imported from England by the Liebig's Extract of Meat Company, and 30 by Mr. Bolitho, Shangani. One animal belonging to the latter reacted to Tuberculin, and was destroyed; four others shewed indefinite reactions, and will be tested at a later date.

HORSE-SICKNESS INOCULATION.—Ten mules inoculated. No deaths.

UMTALI.

AFRICAN COAST FEVER.—That the infection at the farm N'Odzi is very severe is evident from the heavy mortality during May; 40 head were destroyed on shewing temperature reactions. In June a considerable decrease occurred, only eight being destroyed. A thorough inspection was made of all cattle in the neighbourhood of the infected farm, especially of the native cattle between there and the Hondi River. The Cattle inspector reports all stock healthy and in good condition, no suspicion of mortality from any cause, and a fair natural increase since the previous inspection.

MALLEIN TEST.—Nine horses were tested with mallein on importation. No reactions.

IMPORTATION OF CATTLE.—Twenty-three head of slaughter stock from Macequece.

GWELO.

HORSE-SICKNESS INOCULATION.—Seven mules inoculated. No deaths.

VICTORIA.

MALLEIN TEST.—Five horses *ex* Transvaal were tested with mallein. No reactions.

MELSETTER.

MALLEIN TEST.—One horse tested with mallein on importation. No reaction.

GENERAL.—Blood smears from an elephant shot in Lomagundi district by Mr. G. H. McCulloch shewed Anaplasms in large numbers. In all other districts, stock reported healthy.

J. M. SINCLAIR,

Chief Veterinary Surgeon.

Market Reports.

23rd July, 1913.

The produce market in Salisbury is generally well supplied in all lines. Mealies are plentiful, the crop in Mashonaland constituting a record. Rapoko is scarce, but there is no shortage of other grains with the exception of local wheat, of which there is none as yet in the market. Potatoes are short, but the supply of Colonial onions is good.

Bulawayo is fairly well supplied with all kinds of produce.

The demand everywhere for breeding stock is keen. At Messrs. Leonard and Lezard's sale, held at Gwelo on 16th July, slaughter oxen fetched 40s. per 100 lbs., and trek oxen up to £10 10s. There was a big demand for milch cows, and for native and grade breeding stock the enquiry was firm. Five hundred and eighty head were disposed of at this sale.

| Article. | Johannesburg. | | Kimberley. | | Bulawayo. | | Salisbury. | |
|-------------------------------|---------------|------|------------|------|-----------|------|------------|------|
| Barley, 150 lbs. | 12/0 | 13/6 | 11/6 | 13/0 | 26/0 | 28/6 | 27/6 | 30/0 |
| Beans, 203 lbs. | 21/0 | 42/0 | 20/0 | 30/0 | 35/0 | 37/0 | 21/0 | 23/0 |
| Boer Meal, unsifted, 200lbs. | — | — | 27/0 | 32/0 | 40/0 | — | 37/6 | 40/0 |
| Bran, wheaten, 100 lbs. | 8/6 | 9/0 | 6/9 | 7/6 | 13/0 | — | 14/0 | 15/0 |
| Flour, 100 lbs. | — | — | — | — | 28/6 | — | 19/0 | 21/6 |
| „ Colonial, 100 lbs. | — | — | 15/0 | 16/0 | 22/6 | 25/0 | 19/0 | 21/6 |
| Forage, 100lbs. | 4/6 | 6/0 | 4/0 | 6/0 | 10/6 | 11/0 | 7/0 | 8/6 |
| „ Colonial Oat | 5/9 | 6/0 | — | — | — | — | none | — |
| | Bale. | — | — | — | Ton. | — | Ton. | — |
| Hay | 7d. | 9d. | — | — | 60/0 | — | 40/0 | 50/0 |
| Kaffir Corn, 200 lbs. | 15/0 | 15/6 | 12/0 | 17/0 | 23/6 | 25/0 | 14/0 | 15/0 |
| Manna, 100 lbs. | 3/6 | 4/6 | — | — | none | — | 5/0 | 6/0 |
| Mealies, S.A. White, 203 lbs. | 10/6 | 11/6 | 12/0 | 13/6 | 17/6 | 18/0 | 12/6 | 13/0 |
| Mealies, Yellow, 203 lbs. | 10/0 | 10/6 | — | — | 15/6 | 16/6 | none | — |
| Mealie Meal, White, 183 lbs. | 13/9 | 14/3 | 12/6 | 13/6 | 16/0 | 17/0 | 12/6 | 13/0 |
| Munga, 200 lbs. | — | — | — | — | 22/0 | — | 22/6 | 23/0 |
| | 100 lbs. | — | — | — | 70 lbs. | — | — | — |
| Monkey Nuts, bag | 11/6 | 12/6 | — | — | 14/6 | 15/6 | 10/0 | 10/6 |
| Oats, 150 lbs. | 10/0 | 12/9 | 10/0 | 11/0 | 18/6 | 20/0 | 25/0 | 26/0 |
| Onions, 120 lbs. | 10/6 | 12/0 | 9/0 | 12/0 | 20/6 | 21/6 | 25/0 | 27/6 |
| Peas, 200 lbs. | 18/0 | 19/0 | — | — | none | — | none | — |
| Potatoes, new, 150 lbs. | 16/0 | 18/0 | 15/0 | 17/6 | 27/0 | 28/6 | 18/6 | 20/0 |
| „ old, 150 lbs. | — | — | — | — | none | — | none | — |
| Rapoko | — | — | — | — | 22/6 | 23/0 | 15/0 | 16/0 |
| Rye, 200 lbs. | 20/0 | 21/0 | — | — | none | — | none | — |
| Salt, 200 lbs. | 6/0 | 7/0 | — | — | 10/6 | 11/6 | 11/0 | 12/6 |
| Wheat, 203 lbs. | 25/0 | 26/0 | 23/0 | 25/6 | 40/0 | — | 29/0 | 30/0 |
| Butter, local, per lb. | 11d. | 1/3 | 9d. | 1/0 | 1/6 | 1/9 | 2/0 | 2/6 |
| Eggs, local, per dozen | 1/6 | 1/10 | 1/0 | 1/9 | 2/0 | 2/6 | 2/6 | 3/6 |
| Ducks, each | 2/3 | 3/0 | 2/0 | 3/0 | none | — | — | — |
| Fowls, each | 1/6 | 2/9 | 1/6 | 4/0 | 4/0 | 6/0 | 2/6 | 7/0 |
| Geese, each | 3/6 | 4/0 | 3/6 | 4/0 | none | — | 12/6 | — |
| Turkeys, cocks, each | 7/0 | 17/0 | 7/0 | 15/0 | none | — | 15/0 | 20/0 |

LIVE STOCK.

| | | | | | | | |
|----------------------------|--------|--------|---|-------|--------|--------|-------|
| Slaughter Cattle, 100 lbs. | £9 | £14 | — | 32/6 | 36/0 | 40/0 | 42/6 |
| Trek Oxen, trained | £7 | £8/10 | — | £8/10 | £12 | £10/10 | £12/7 |
| Local Cows, milk | — | — | — | £25 | £30 | £25 | — |
| Dairy Cows | £20 | £30 | — | £20 | £32 | £25 | £35 |
| Native Cows | £6 | £7 | — | — | — | £9 | £10 |
| Heifers, Colonial | £5 | £5/10 | — | £10 | £17/10 | £9 | £11 |
| „ Native | — | — | — | — | — | £6 | £7 |
| Pigs, live weight | 3½d. | 4d. | — | 3d. | 4d. | 4d. | — |
| Horses, riding, salted | — | — | — | — | — | £35 | £40 |
| „ „ unsalted | £22/10 | £27/10 | — | £20 | £35 | £22/10 | £30 |
| Mules, inoculated | £20 | £25 | — | £31 | £37 | £30 | £35 |
| Donkeys, geldings | £5 | £7 | — | £7/10 | £8/10 | £6 | £7 |
| „ mares | — | — | — | £8/10 | £10/10 | £7 | £10 |
| Goats | 8/0 | 12/0 | — | 12/0 | 14/0 | 10/0 | 14/6 |
| Persian Ewes | — | — | — | — | — | 20/0 | 22/6 |
| Cross-bred Ewes | — | — | — | — | — | 20/0 | 22/6 |
| Sheep, slaughter | 17/0 | £1 | — | 15/0 | 17/6 | 20/0 | 25/0 |

Garden Calendar.

August and September.

By N. L. KAYE-EDDIE.

THE FLOWER GARDEN.

August.—This is a busy month, and the soil should be kept in good tilth. Roses, shrubs and ornamental trees may be planted. All seeds may now be sown. Marguerite Carnations sown now will flower by the end of the year. Cuttings of carnations and other perennials should be planted either in the open ground or in boxes, using loose and well-decomposed soil for the latter, taking care that they are well drained, or the success will be small.

September.—Although our spring advances with this month, rains are very uncertain and sometimes scarce, but in spite of circumstances plants now grow with very little encouragement. Perennials and shrubs should be well attended to, especially those which flower early; the soil should be kept well stirred around the stems, and they should be watered if necessary.

Practically all flower seeds may now be sown in boxes, nursery beds, or in the open ground where they are to be grown. Nursery beds are perhaps preferable, as a great deal of watering may have to be resorted to on account of late rains. All annuals sown in July should now be ready for transplanting; should these be few, and a larger show of flowers desired, the heads may be pinched out after planting, which makes the plant spread out more and become bushy. Shrub and ornamental tree seeds should be sown now if desired for planting out during the rainy season, and may be sown in the open;

if it is desired to hasten them they should be planted in boxes and covered with glass, and placed in a sunny position sheltered from the winds. If summer bulbs have not already been replanted, this should be done at once; they sprout as the weather becomes warmer, and, if allowed to do this before planting, the bulb loses much of its vigour. It must be borne in mind that all bulbs that cluster, if divided, produce better blooms, and the plants have a better appearance than the old cluster, which has a lot of decayed matter and generally a ragged appearance; this also applies to those perennials which may be increased by division of roots.

KITCHEN GARDEN.

August.—All vegetable seeds may now be planted. Those having but a limited supply of water would be wise to sow in boxes, transplanting when large enough. The seed beds require careful preparation; they should be well raked up and laid out in long narrow rows in order to facilitate watering. The tops of the beds should be levelled as near as possible, and when sown, covered over with a thin layer of straw or grass, which will prevent the seeds being washed out when watering and the soil from caking.

September.—Most seeds may now be sown, though there is risk of losses from want of rain. Watering, of course, can be resorted to. Marrows, pumpkin, melon, cucumber, and peas may be planted in the field after the first rains. Tomatoes that have been sown earlier should be planted out, and these as they come on should be staked.

Weather Bureau.

TEMPERATURES.

| STATION | MAY | | JUNE | |
|--|-------|-------|-------|-------|
| | M. | Min. | Max. | Min. |
| MASHONALAND— | | | | |
| Charter, Grootfontein ... | 76·0 | 45·0 | — | — |
| Hartley, Giant Mine ... | 79·45 | 51·16 | 70·60 | 43·09 |
| „ Hallingbury Farm ... | 70·0 | 47·6 | 73·0 | 39·4 |
| Lomagundi, Sinoia ... | 81·0 | — | — | — |
| Melsetter, Government Offices ... | 66·6 | 50·8 | 63·3 | 43·9 |
| „ Mount Selinda ... | 72·8 | 51·7 | 65·3 | 45·1 |
| Salisbury, Agricultural Laboratory ... | — | — | — | — |
| „ Chishawasha ... | 73·9 | 49·0 | 70·6 | 42·4 |
| „ The Gaol ... | 73·2 | 48·1 | 69·1 | 40·0 |
| „ Shamva Mine ... | — | — | — | — |
| Umtali, Chiconga's Location ... | 76·2 | 51·7 | 70·5 | 41·6 |
| „ Summerfield ... | 69·3 | 49·6 | 65·2 | 42·9 |
| Victoria ... | 74·58 | — | 71·06 | — |
| MATABELELAND— | | | | |
| Bulawayo, Essexvale ... | 77·06 | 49·67 | 72·3 | 39·93 |
| „ Observatory ... | 74·7 | 49·5 | 67·2 | 43·9 |
| „ Rhodes Matopo Park ... | 74·7 | 48·2 | 69·03 | 41·1 |
| Gwelo, The Gaol ... | 73·3 | 48·5 | 68·77 | 40·82 |
| Mangwe, Empandeni ... | 76·3 | 49·9 | 70·14 | 41·6 |
| Tuli, Police Camp ... | 82·8 | 54·3 | 78·0 | 38·51 |

RAINFALL.

| STATION | May. | June. |
|-----------------------|------|-------|
| MASHONALAND : | | |
| Charter— | | |
| Driefontein ... | 0·30 | x |
| Enkeldoorn ... | 0·17 | — |
| Grootfontein ... | x | — |
| Marshbrook ... | 1·09 | — |
| The Range ... | x | x |
| Rhodesdale Estate ... | 0·27 | — |
| Riversdale ... | 1·15 | — |
| Umvuma (Railway) ... | x | x |

RAINFALL—(Continued).

| STATION | | | May. | June. |
|---------------------------|-----|-----|------|-------|
| MASHONALAND—(Continued) | | | | |
| Hartley— | | | | |
| Ardgowan | ... | ... | 1·12 | — |
| Battlefields (Railway) | ... | ... | x | x |
| Carnock Farm | ... | ... | 0·40 | — |
| Elandsfontein | ... | ... | 0·20 | — |
| Elvington | ... | ... | 0·21 | x |
| Franceys | ... | ... | 0·18 | — |
| Gatooma | ... | ... | 0·94 | — |
| Gatooma (Railway) | ... | ... | x | x |
| Giant Mine | ... | ... | x | x |
| Gowerlands | ... | ... | 0·73 | — |
| Hallingbury | ... | ... | x | x |
| Hartley (Gaol) | ... | ... | x | x |
| Hartley (Railway) | ... | ... | — | — |
| “Jenkinstown” | ... | ... | 0·03 | — |
| Makwiro | ... | ... | 0·21 | — |
| Shagari | ... | ... | 0·14 | — |
| “Stoneygate” | ... | ... | 0·49 | — |
| Lomagundi— | | | | |
| Banket Junction (Railway) | ... | ... | x | x |
| Darwendale | ... | ... | 0·23 | x |
| Duxbury Farm | ... | ... | 0·49 | — |
| Eldorado (Railway) | ... | ... | x | x |
| Kanyemba | ... | ... | x | x |
| Lone Cow Estate | ... | ... | x | x |
| Palm Tree Farm | ... | ... | 0·41 | — |
| Sipolilo | ... | ... | 0·94 | x |
| Sinoia | ... | ... | x | x |
| Makoni— | | | | |
| Eagle's Nest | ... | ... | 2·32 | 0·05 |
| Inyanga | ... | ... | 3·27 | — |
| Monte Cassino | ... | ... | 2·41 | — |
| Rusape | ... | ... | 0·87 | x |
| Rusape (Railway) | ... | ... | x | x |
| York Farm | ... | ... | x | x |
| Mangwendi— | | | | |
| Bonongwe | ... | ... | 1·78 | 0·01 |
| Glen Somerset | ... | ... | 1·95 | 0·09 |
| “Good Hope” | ... | ... | x | x |
| Land Settlement Farm | ... | ... | 1·61 | x |
| Macheke (Railway) | ... | ... | 2·52 | — |
| Marandellas | ... | ... | x | x |
| Marandellas (Railway) | ... | ... | x | x |
| Mrewa | ... | ... | 2·49 | x |
| Mtoko | ... | ... | 0·56 | x |
| Mungo Estate | ... | ... | x | x |
| Rusawi (Outspan) | ... | ... | x | x |
| Selous Nek | ... | ... | 1·55 | — |
| Tweedjan | ... | ... | 0·91 | — |
| Mazoe— | | | | |
| Avonduur | ... | ... | 1·71 | x |

RAINFALL—(Continued).

| STATION | | | | May. | June. |
|-------------------------------------|-----|-----|-----|------|-------|
| MASHONALAND—(Continued) | | | | | |
| Mazoe (Continued) | | | | | |
| Bindura | ... | ... | ... | 3.50 | x |
| Chin Mine, Mount Darwin | ... | ... | ... | x | x |
| Claverhill | ... | ... | ... | 1.97 | x |
| Dunmaglas | ... | ... | ... | x | x |
| Lagnaha | ... | ... | ... | 1.54 | x |
| Lowdale | ... | ... | ... | x | x |
| Mazoe, Native Commissioner's Office | ... | ... | ... | x | x |
| Mount Darwin | ... | ... | ... | 1.82 | — |
| Omeath | ... | ... | ... | 0.69 | — |
| Sleamish | ... | ... | ... | 1.36 | x |
| Sunnyside | ... | ... | ... | 0.89 | — |
| Teign | ... | ... | ... | 0.53 | — |
| Umvukwe Flats | ... | ... | ... | 1.01 | x |
| Melsetter— | | | | | |
| Chikori | ... | ... | ... | x | x |
| Chipinga | ... | ... | ... | 1.96 | x |
| Helvetia | ... | ... | ... | 3.93 | x |
| Mutambara Mission | ... | ... | ... | x | x |
| Melsetter | ... | ... | ... | x | x |
| Mount Selinda | ... | ... | ... | x | x |
| Tom's Hope | ... | ... | ... | 1.83 | 0.16 |
| Vermont | ... | ... | ... | x | x |
| Salisbury— | | | | | |
| Agricultural Laboratory | ... | ... | ... | 1.22 | — |
| Avondale | ... | ... | ... | 1.56 | x |
| Brookmead | ... | ... | ... | x | x |
| Chishawasha | ... | ... | ... | x | x |
| Cleveland Reservoir | ... | ... | ... | 0.25 | — |
| Convent | ... | ... | ... | 1.11 | x |
| Goromonzi | ... | ... | ... | 1.22 | x |
| Hillside | ... | ... | ... | 0.59 | — |
| Meadows | ... | ... | ... | 0.94 | x |
| Public Gardens | ... | ... | ... | x | x |
| Rhodesville | ... | ... | ... | x | x |
| Salisbury (Club) | ... | ... | ... | x | x |
| „ (Gaol) | ... | ... | ... | 0.84 | — |
| „ (Railway) | ... | ... | ... | x | x |
| Shamva | ... | ... | ... | x | x |
| „ Mine | ... | ... | ... | x | x |
| Stapleford | ... | ... | ... | x | x |
| Westridge | ... | ... | ... | x | x |
| Umtali— | | | | | |
| Chiconga's Location | ... | ... | ... | x | x |
| Champion Mine | ... | ... | ... | x | x |
| Gaol | ... | ... | ... | x | x |
| Odzi | ... | ... | ... | x | x |
| Premier Estate | ... | ... | ... | x | 0.07 |
| Selim Mine | ... | ... | ... | x | x |
| Summerfield | ... | ... | ... | x | x |

RAINFALL (*Continued*).

| STATION | | | | May. | June. |
|--------------------------|---------------------------------|-----|-----|------|-------|
| MASHONALAND—(Continued) | | | | | |
| Umtali (Continued) | | | | | |
| Umtali (Railway) | ... | ... | ... | 0·57 | 0·60 |
| Utopia | ... | ... | ... | 1·09 | x |
| Victoria— | | | | | |
| Chibi | ... | ... | ... | 0·53 | x |
| Chilimanzi | ... | ... | ... | x | x |
| Chingombie | ... | ... | ... | 1·08 | x |
| Chiredzi Ranche, Ndanga | ... | ... | ... | 0·93 | 0·10 |
| Empress Mine | ... | ... | ... | 0·61 | x |
| Gokomere | ... | ... | ... | 1·18 | 0·19 |
| Gutu | ... | ... | ... | 1·27 | — |
| Halliday's Farm | ... | ... | ... | 0·51 | 0·10 |
| Marah Ranche | ... | ... | ... | x | x |
| Marthadale | ... | ... | ... | 0·47 | 0·26 |
| Morgenster | ... | ... | ... | 0·66 | 0·13 |
| Noeldale | ... | ... | ... | 1·42 | — |
| Pamushana | ... | ... | ... | — | 0·05 |
| Silver Oaks | ... | ... | ... | 0·62 | 0·11 |
| Victoria | ... | ... | ... | x | x |
| MATABELELAND : | | | | | |
| Belingwe— | | | | | |
| Dawn Farm | } Native district of
Insiza. | | | 0·54 | x |
| Filabusi | | | | 0·20 | x |
| Fort Rixon | | | | 0·08 | — |
| Infiningwe | | | | 0·49 | — |
| Insiza (Railway) | | | | 0·45 | — |
| Thornville | | | | 0·65 | — |
| Shangani (Railway) | ... | ... | ... | x | — |
| Tamba | ... | ... | ... | x | x |
| Bubi— | | | | | |
| Inyati | ... | ... | ... | x | x |
| Bulalima— | | | | | |
| Figtree | ... | ... | ... | 0·26 | x |
| Magot | ... | ... | ... | 0·75 | — |
| Marula | ... | ... | ... | x | x |
| Plumtree | ... | ... | ... | x | x |
| Solusi | ... | ... | ... | 0·21 | — |
| Syringa | ... | ... | ... | 0·47 | — |
| Tegwani | ... | ... | ... | 0·23 | x |
| Bulawayo— | | | | | |
| Balla Balla (Railway) | ... | ... | ... | 0·38 | — |
| Bembesi (Railway) | ... | ... | ... | — | — |
| Dewhurst | ... | ... | ... | x | x |
| Edwaleni | ... | ... | ... | x | x |
| Essexvale | ... | ... | ... | 0·61 | — |
| Government House | ... | ... | ... | x | x |
| Gwaai (Railway) | ... | ... | ... | x | x |
| Heany Junction (Railway) | ... | ... | ... | x | x |

RAINFALL (*Continued*).

| STATION | | | May. | June. |
|------------------------------|-----|-----|------|-------|
| MATABELELAND—(Continued) | | | | |
| Bulawayo (Continued) | | | | |
| Hope Fountain | ... | ... | 0·09 | — |
| Imbesa Kraal | ... | ... | — | — |
| Khami | ... | ... | 0·18 | — |
| Lochard Experiment Farm | ... | ... | 0·02 | x |
| Matopo Mission | ... | ... | x | x |
| Maxim Hill | ... | ... | — | x |
| Melinakanda Junction | ... | ... | x | x |
| Mpondeni | ... | ... | x | x |
| Nyamandhlovu | ... | ... | — | — |
| Observatory | ... | ... | x | x |
| Pendennis | ... | ... | 0·33 | x |
| Raylton | ... | ... | x | x |
| Rhodes Matopo Park | ... | ... | x | — |
| Umgusa | ... | ... | x | x |
| Gwanda— | | | | |
| Antelope Mine | ... | ... | 0·39 | 0·01 |
| Gwanda (Gaol) | ... | ... | 0·18 | — |
| „ (Railway) | ... | ... | 0·10 | — |
| Malundi | ... | ... | 0·85 | — |
| Mtshabzi Mission | ... | ... | 0·30 | x |
| West Nicholson (Railway) | ... | ... | 0·38 | — |
| Gwelo— | | | | |
| Globe and Phoenix (Railway) | ... | ... | x | x |
| Gwelo (Gaol) | ... | ... | x | x |
| Gwelo (Railway) | ... | ... | x | x |
| Lalapanzi | ... | ... | 0·40 | 0·06 |
| Lower Gwelo | ... | ... | 0·21 | — |
| Que Que | ... | ... | x | x |
| Selukwe (Railway) | ... | ... | x | x |
| Shawlands | ... | ... | 0·42 | — |
| Mangwe— | | | | |
| Empandeni | ... | ... | x | x |
| Garth | ... | ... | 0·57 | 0·04 |
| Sebungwe— | | | | |
| Gokwe | ... | ... | 0·25 | x |
| Tuli— | | | | |
| Lamulas | ... | ... | 2·57 | x |
| Makalali | ... | ... | 1·79 | x |
| Manantji | ... | ... | 1·98 | x |
| Manyoni | ... | ... | 2·40 | x |
| Mazunga | ... | ... | 1·76 | x |
| Tuli | ... | ... | 1·58 | — |
| Wankies— | | | | |
| Malindi (Railway) | ... | ... | 0·49 | — |
| Victoria Falls (Police Camp) | ... | ... | x | x |
| Victoria Falls (Railway) | ... | ... | x | x |
| Wankies Hospital | ... | ... | 0·05 | — |
| Wankies (Railway) | ... | ... | x | x |

x No return received.

— No rainfall.

Dates of Meetings of Farmers' Associations, Southern Rhodesia

(SUBJECT TO ALTERATION)

| Name of Association | Place of Meeting | Secretary | 1913 | | |
|----------------------------------|---|------------------|----------------|----------------|------|
| | | | Aug. | Sept. | Oct. |
| Bindura | Bindura | S. E. Ford | .. | 14 | .. |
| Charter—Mrezi | Mrezi | W. Krienke | .. | 24 | .. |
| Central | Unvuma | C. Napier | 20 | 26 | 31 |
| Enterprise | Arcturus Hotel | R. Philip | 12 | 9 | 14 |
| Figtree Branch, R.L. and F.A. | Figtree Hotel | A. Curtis | 0 | .. | .. |
| Gatooma | Gatooma | R. F. Thomas | .. | .. | 30 |
| Gazaland | Chippinga | L. Doell | 0 | 13 | 11 |
| Greystone | Rodeheavel | J. W. Spencer | .. | .. | .. |
| Hartley | Commercial and Flanders Hotels,
Hartley, alternately | L. Savory | 0 | 6 | 11 |
| Headlands | Headlands Siding | J. M. Harvard | .. | 27 | .. |
| Insiza | Insiza | J. W. Jones | .. | .. | 4 |
| Lalapanzi | Lalapanzi Hotel | B. Smit | 15 | 19 | 17 |
| Lomagundi | Sinoia | J. N. Bateman | .. | 20 | .. |
| Macheke | Macheke | H. H. Kidson | .. | 6 | .. |
| Makoni | Rusape | W. S. Tapson | .. | 6 | .. |
| Makwiro | Makwiro | A. B. Fraser | 16 | 20 | 18 |
| Manica | Christmas Pass Hotel | J. S. Holland | 2 | 6 | 4 |
| Marandellas | Marandellas | C. M. Wright | 2 | 3 | .. |
| Mangwendi | Fixed every meeting | .. | 23 | 27 | 25 |
| Marula | Marula Siding | MacW. Ingram | 2 | 6 | 4 |
| Mashonaland | .. | W. H. Williamson | .. | .. | .. |
| Matopo Branch, R.L. and F.A. | .. | W. E. Dowsett | .. | .. | .. |
| Mazoe | Rockwood Siding, for August | F. C. Peek | 13 | 6 | .. |
| Melsetter (North) | Various Farm Houses | N. N. Rutherford | .. | .. | .. |
| Midlands | Gwelo | H. K. Paches | .. | .. | .. |
| Northern Untali | Farm "Summerfield" | R. W. H. Blorton | .. | .. | .. |
| Pfuntwe | Pfuntwe | H. J. Brooke | .. | 13 | 11 |
| Que Que | Globe & Phoenix Hotel | E. S. Soperet | 16 | 20 | 18 |
| Rhodesian Landowners and Farmers | Belwayo | H. S. Hopkins | 20 | 26 | 31 |
| Shamva | Shamva | J. M. Mombay | No dates fixed | Once a quarter | .. |
| Selukwe | Selukwe | F. S. Clark | 2 | 6 | 4 |
| Somalula and Shangani Flats | Farm "Fairview" | S. Annandale | 2 | 6 | 4 |
| Unrukwé | Barkdale (Mr. H. A. Woods) | J. S. Parker | 20 | 17 | 15 |
| Victoria | Victoria | J. Rutherford | .. | .. | .. |

Departmental Notices.

Information for Farmers

The Department of Agriculture is prepared to furnish to farmers technical advice either by correspondence, or, where possible, by personal visits. All communications should be addressed in the first instance to the Director of Agriculture.

Crops

The Agricultural Branch deals with enquiries relating to agricultural practice, soils, crops, cultural operations, processes, seeds, trees, farm implements and machinery, etc.

Poisonous Plants

It is of great importance that as soon as possible a study should be made of those plants found in Southern Rhodesia which are poisonous or deleterious to small or large stock. Farmers and others who have known, or suspected poisonous plants on their property, are requested to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, at the same time forwarding specimens of the plant, including stem, leaves, flowers, and, where possible, fruit. Any particular regarding the habits of the plant will be welcomed, and in return the Department will supply all available information regarding the plants.

Disposal of Seeds

All farmers and others who have surplus supplies of good quality locally grown farm seed of any description are invited to communicate with the Government Agriculturist and Botanist, Department of Agriculture, Salisbury, stating what

quantities are available for sale, and price f.o.r. nearest station. In all cases representative samples of the grain must accompany the letter, but need not exceed two ounces in weight.

The Agricultural Department is continually receiving enquiries as to where various seeds can be obtained, and it is hoped that by the above means growers of reliable seed may be brought into touch with one another.

It must be clearly understood, however, that beyond recommending sources of supply, the Department cannot take any further part in the transaction.

Tobacco

The services of the Tobacco Expert are available to all desiring advice on the subject. Applications should be accompanied by particulars of the nature of the information sought, also the distance and direction of the farm from some well known centre.

Live Stock

The Animal Industry Branch is prepared to advise with regard to all matters connected with stock breeding, selection, feeding and registration of stud animals, the dairy industry, poultry management, farm buildings for stock, and kindred subjects. Buyers and sellers of stud stock in Rhodesia are also put in touch with one another.

Purchase of Stock in the Cape and Free State Provinces of the South African Union, on behalf of Farmers resident in Southern Rhodesia

The following amended arrangements are published for general information :—

The Government undertakes the purchase of pure-bred live stock for farmers on the conditions outlined below, and on the following terms of payment, viz. :—(1) a deposit on application; (2) one-third total cost on delivery, less amount of

deposit; (3) one-third after six months, and (4) one-third after twelve months—both these instalments bearing interest at 6 per cent. or 10 per cent. if not paid at due date. These terms of credit will only be allowed on purchases up to a total maximum value of £200; sums exceeding that amount are payable in cash along with the first instalment. The Government reserves the right to refuse, without reason given, applications, or to fulfil purchases even after deposit has been made. Applications must be on the prescribed Form "A," and all conditions complied with before same is registered. Applications will be considered in rotation, but fulfilled as opportunity serves, so that animals may be procured as cheaply as possible. The buyer must undertake to accept the animal allotted to him, unless it fails to satisfy description as given in the application form. Disputes may be submitted to arbitration. The purchase price will include all expenses up to time of delivery, price paid to original owner, commission and charges of buyer and freight, including, where necessary, attendance and keep on journey. With every application a deposit must be forwarded; £1 per head in the case of cattle, horses and donkeys, and 5s. per head for sheep, goats and pigs. Such deposit will be deducted from the amount of the first instalment due, but may be forfeited in the event of the application being withdrawn after having been registered. Stock is not to be disposed of without the written consent of the Director of Agriculture until payment is completed.

Purchases will be made by the Department of Agriculture through its authorised representatives. Every effort will be made to secure animals in accordance with particulars furnished by applicants, and to the best advantage. All purchases must conform strictly to the importation regulations as regards age and freedom from contact with contagious disease. Pedigrees, if obtainable, will be supplied. The Government will bear all risks of transport and of death from any cause until delivery, all losses being chargeable to the vote. All animals failing to pass the necessary test on arrival shall be destroyed and the loss borne by the Government, and another animal purchased for the applicant.

Prospective buyers will be advised of the probable cost. The Department does not undertake to purchase stock at precisely the prices specified by applicants, but will endeavour to

approximate as nearly as possible to the figures given and not to exceed same by over 20 per cent. The authorised representatives of the Department will be allowed a reasonable commission, with expenses additional.

The first instalment will become due and payable on delivery. Applicants or their agents will be advised regarding arrival of their stock, after which all responsibility on the part of the Department will cease.

Entomology

The Government Entomologist advises on matters connected with insect pests of live stock, crops, and fruit trees, and also undertakes the inspection of nurseries and of the importation of plants from abroad.

Chemical Analyses

The Government Agricultural Chemist deals with matters relating to the composition of soils, fertilisers, farm produce of vegetable or animal origin; also the investigation of poisons and of articles of potential economic value.

Nominal charges are made, which, while not covering the cost, will help to defray the expense and serve as a proof of good faith. Samples, carriage prepaid, together with full particulars regarding the subject should be addressed to the Agricultural Chemist, Department of Agriculture, Salisbury.

A schedule of charges and directions for taking samples will be furnished on application.

With all analyses, reports will be furnished explanatory of the results and, when possible, advice given as to the nature, properties and value of the material.

No charge will be made for analysis where the material forwarded is considered by the Director of Agriculture and Chemist to be of sufficient general interest.

Services of Government Veterinary Surgeons

1. The services of Government Veterinary Surgeons are available to the public, free of charge, for the following purposes only :—

- (1) Attending and giving professional advice in connection with the following diseases, viz. :—Anthrax, Contagious abortion, East Coast Fever, Epizootic Lymphangitis, Foot and Mouth Disease, Farcy, Foot-rot, Heartwater, Glanders, Intestinal parasites amongst sheep and goats, Liver Disease, Lung sickness, Osteo Porosis, Malarial Catarrhal Fever (blue tongue), Rabies, Redwater, Rinderpest, Scabies, Sponziekte (quarter evil), Swine Fever, and any other diseases which may in future be scheduled in terms of section 3, sub-section 18 of the "Animals Diseases Consolidation Ordinance, 1906." Attending to cases of disease amongst live stock which, though not of a contagious or infectious character, may be of general public importance.

- (2) Applying tests in regard to Glanders, Tuberculosis, or any other disease against the introduction or spread of which tests are applied under regulations.

- (3) Inoculations against the following diseases :—

Horsesickness, Lung sickness, Anthrax, Quarter Evil, Redwater, Malarial Catarrhal Fever (blue tongue). A fee to cover the cost of serum and virus will be charged.

2. The following charges shall be made and payable for services rendered by the Government Veterinary Surgeons in other cases, viz. :—

| | £ | s. | d. |
|---|---|----|----|
| (1) For every professional visit within three miles of his office or residence | 0 | 5 | 0 |
| (2) For every professional visit beyond such distance | 0 | 10 | 6 |
| plus an additional charge of 2/6 per hour whilst engaged in such visits or £2/2/0 a day of 24 hours ; | | | |

| | £ | s. | d. |
|---|---|----|----|
| (3) For advice given at the Veterinary Surgeon's office, for each animal, per visit | 0 | 2 | 6 |
| (4) The following to be charged in addition to visiting fees :— | | | |
| a. For every examination as to soundness, each | 1 | 1 | 0 |
| b. For castration, horses, each | 1 | 1 | 0 |
| c. For castration, bulls, each | 0 | 5 | 0 |
| d. For castration, donkeys, each.. ... | 0 | 10 | 6 |
| e. For parturition cases, mares, each | 2 | 2 | 0 |
| f. For parturition cases, cows, each.. | 1 | 1 | 0 |
| g. For other operations, according to nature, from 5/- to £2/2/0. | | | |

3. Double the above fees will be payable for services rendered on Sundays, public holidays, and between the hours of 7 p.m. and 7 a.m.

4. Applicants for the services of Government Veterinary Surgeons must at their own cost provide the necessary transport for the conveyance of these officers from, and back to, their residence or nearest railway station.

5. Farmers and owners of stock throughout the country frequently telegraph for a Government Veterinary Surgeon to be sent to attend an animal which has been taken seriously ill. It is rarely possible to comply with these requests at once, as the Veterinary Surgeon may be engaged on duty which he cannot leave, or is at such a distance from where his services are required that he can hardly be expected to arrive in time to be of any service in an urgent case. Hence much valuable time is wasted, the owner of the animal is dissatisfied, and the veterinary staff discredited. To obviate this, in all cases where veterinary advice and assistance are required, the owner should telegraph to "Veteran," Salisbury, with prepaid reply, the nature of the complaint that the animal is suffering from, giving as full and accurate a description of the symptoms as possible. This will enable the Chief Veterinary Surgeon to

telegraph advice at once and state whether he is able to arrange for veterinary attendance on the case or not, and save valuable time, which is always of importance in acute cases.

6. The services of Government Veterinary Surgeons will only be available for private work with the consent of such officers, and when such work does not interfere with their official duties, or when the services of a private practitioner are not available.

7. As the arrangement of allowing Government Veterinary Surgeons to attend to private cases is intended purely for the benefit of farmers and stock-owners who may wish to obtain professional advice, no responsibility whatever will be accepted for any loss of stock, etc., which may result from the negligent treatment or advice, or wilful default, of any Government Veterinary Surgeon.

8. All fees collected in terms of these Regulations are payable to the Treasury through the local Receiver of Revenue.

Sale of Dip

With a view to enabling farmers to obtain dipping material at as low a rate as possible arrangements have been made whereby orders may be placed with any officer of the Veterinary Department for the purchase of supplies of Messrs. W. Cooper & Nephew's cattle dipping fluid, adapted for three-day, five-day or less frequent dipping. The price of the dip is 48s. 6d. per 10 gals., in not less quantities than that amount, delivered at any siding or station desired, in 5 gal. drums. Applications must be accompanied by remittances, without which they cannot receive attention. Remittances by cheque should be made in favour of Messrs. Meikle Bros., agents for the dipping fluid, commission being added, where necessary, to cover exchange. Coin or stamps will not be accepted. This dip is in use at all Government dipping tanks.

Sale of Virus

It is notified for public information that redwater and gall-sickness (*anaplasmosis*) virus may be obtained from the Veterinary Department, Salisbury, at a charge of ten shillings per dose.

Solutions of trypan blue and the injection used in the treatment of *trypanosomiasis* (fly disease) of cattle may also be obtained at a charge of five shillings per dose and blue tongue virus at one shilling and sixpence per dozen doses.

No material will be issued unless a remittance accompanies the order.

Irrigation

From the Agricultural Engineer assistance may be obtained by farmers for the following :—

1. In the locating of possible irrigation projects.
2. In the preparation of surveys or plans and for irrigation works, including weirs, dams, furrows, pumping plants, and determining the extent of land which may be brought under irrigation schemes, together with rough estimates of costs.
3. In the supervision of construction and carrying out of projects.
4. In the selection of suitable sites for boring operations.
5. Preparing specifications, etc., regarding pumping plants, windmills, and agricultural machinery.
6. Giving general advice on cognate subjects.

Informal advice of a general character will be given to applicants making enquiry by letter or in person. Any applicant desiring professional assistance likely to occupy more than one day should apply for advice in writing. All applicants should specify clearly the nature of the project on which they seek advice, and should give full particulars as to the distance and direction of their farms from some well-known centre. Applicants will be required to provide suitable means of transport for the officer concerned during the period devoted to work on the spot; to provide any unskilled labour that may be required; and to provide for any other contingent services. Applications should be addressed to the Director of Agriculture, who will endeavour to arrange visits as far as possible in order of application, but with due regard to situation, in order

to obviate unnecessary travelling and delay. The services of the Agricultural Engineer are given free, but in cases demanding prolonged individual attention, or repeated supervision, a charge may be made according to circumstances.

Samples

In connection with enquiries, especially with regard to diseases amongst crops, insect pests, soils, grain and the identification of plants, specimens should, wherever possible, be sent, together with full details. It is found that such parcels are often forwarded without any indication of where they are from or why they were sent and it is difficult in such cases to trace the sender. It is, therefore, requested that persons when forwarding samples for examination, indicate clearly their names and address on the package, so as to enable their requirements to be attended to without delay.

Charges for Dipping Cattle at Government Dipping Tanks.

On and after the 1st November, 1912, a charge of 1d. per head will be made in respect of all cattle dipped at Government dipping tanks.

Unweaned calves will be dipped free of charge.

Payment may be made in cash or by means of books of coupons at £1, 10/- and 2/6, which can be obtained from Civil Commissioners, Native Commissioners, or through all Veterinary Surgeons and Cattle Inspectors.

The tanks to which these provisions at present apply are the following :—

Salisbury (3), Bulawayo (3), Inyati, Umtali, Penhalonga, Melsetter, Marandellas, Macheke, Mazoe, Lomagundi, Hartley, Gwelo, Selukwe, Enkeldoorn, Victoria, Gwanda, Gatooma, Que Que, Umvuma, Kimberley Reefs.

Lectures for Farmers

The services of certain of the officers of the Department of Agriculture and the Veterinary Department are available for purposes of delivering lectures on subjects upon which they have special knowledge. As far as practicable, lectures will be accompanied by demonstrations at the time or subsequently in the field. Owing to the many calls on the time of the staff and the exigencies of their duties, alternative dates are desirable in order to avoid disappointment. The following topics are offered as examples of subjects that may be dealt with in this manner, but the suggestion of other themes is invited.

Agriculture.—Maize growing; Maize selection and maintenance of the breeding plot; Points of maize and maize judging, with demonstrations; Utilisation of granite vlei soils; Ground nut culture; Rotation crops for home use and for sale; Veld improvement by winter grasses; Production of foodstuffs for the mines; Ensilage; Fungoid diseases of maize and wheat; Wheat, oats and lucerne under irrigation; The prospects of cotton culture in Southern Rhodesia.

Veterinary Hygiene.—Detection and prevention of disease; The care of live stock.

Live Stock.—Judging of cattle according to breeds, and for beef, milk and draught; feeding and kraaling of live stock; general principles of cattle breeding; management of imported stock; grading up of native or local stock with pure bred bulls.

Dairying.—Home butter-making; building and equipment of a farm dairy; handling and marketing of milk; packing and marketing of butter; construction of cow houses.

Swine Husbandry.—Breeding and feeding of swine; some suggestions for the production of first-class bacon pigs; construction of piggeries at moderate cost.

Chemistry.—The principles of soil fertility; the principles of manuring; the value of lime in agriculture; chemistry of milk and its products (accompanied by demonstrations in milk-testing).

Entomology.—Economic entomology on the farm; the role of insects and their allies in the transmission of disease;

scale insects and fruit trees and methods for their control; insect pests and maize; enemies of the potato, insect and fungus; the value and objects of plant import and nursery regulations.

Irrigation.—Methods of applying water to land for irrigation; the measurement of water in connection with irrigation; canal irrigation; storage reservoirs; hints on the selection of sites and on the design of earthen and other dams; irrigation by pumping, with notes on the selection of plants.

Enquiries and invitations should in the first instance be addressed to the Director of Agriculture, Salisbury.

Co-operative Experiments

Distribution of Seed.—The Department of Agriculture expects to have in stock the following seeds for distribution this season under the usual terms of Co-operative Experiments. Farmers anxious to test crops which have proved successful on the Experiment Stations, on a small scale before sowing more largely, are invited to send in their applications as soon as possible. The distribution is limited, and not more than three to five sorts can be sent to each applicant. The amount sent to any one farmer will depend on the number of applications received, but in any case, sufficient seed will be forthcoming to give the crops a fair trial.

Seed is issued f.o.r. Salisbury, and farmers are required to pay railway carriage. With the Agricultural Parcels Post Regulations now applicable this means of forwarding will be found cheaper and more rapid. Under these terms the seed is issued, on condition that the farmer co-operating *supplies at the end of the season a true report on the result of the experiments on forms supplied for that purpose.*

Applications should be addressed to the Government Agriculturist and Botanist, and, as far as possible, will be dealt with in the order received.

Summer Wheat and Oats.—Victoria Wheat, Sidonian Oats (early), New Zealand Oats (mid season), Algerian Oats (late).

Other Summer Cereals.—Boer Manna, Japanese Millet, Teff Grass.

Leguminous Crops.—Egyptian Clover, Velvet Beans, Cow-peas, Florida Beggar Weed, Vetches, Lucerne, Ground-nuts—Virginian and Spanish, Dhal.

Root Crops.—Mangels, Carrots, Chicory.

Pasture Plants.—Paspalum, Toowomba Canary Grass, Burnet, Tall Fescue, Cocksfoot, Brome Grass, Clover.

Miscellaneous Crops.—Linseed, varieties Castor Oil, varieties Cattle Melon, Sunflower, Rape, Thousand Head Kale.

Sale of Seed Maize

Selected seed maize of the under-mentioned varieties, grown on the Government Experiment Farm, Gwebi, will be available for sale during the months of August and September:—

| | | | | | |
|-----------------|-----|-----|-----|-----|---------|
| Hickory King | ... | ... | ... | ... | 8 row. |
| Hickory King | ... | ... | ... | ... | 10 row. |
| Salisbury White | ... | ... | ... | ... | 12 row. |

This seed is the outcome of four years' careful selection, and is offered for sale in order that farmers may be able to establish breeding plots on a reasonably large scale with seed which may be expected to breed true to type.

The price is 15s. per 100 lbs., free on rail, Salisbury, and applications should be addressed to the Government Agriculturist and Botanist, Department of Agriculture, Salisbury.

The quantity being limited, it is not possible to supply more than two or three bags to any one applicant. A large number of applications for the seed is anticipated, and applicants should apply early.

Tobacco Seed

Tobacco planters are reminded that orders for seed should be forwarded to the Manager of the Warehouse, Salisbury, on or before the 15th August.

CITRUS CULTIVATION.

THE services of Mr. C. E. Farmer, Adviser on Citrus Cultivation to the British South Africa Company, are available. The British South Africa Company will be pleased to receive applications from farmers desirous of obtaining advice from Mr. C. E. Farmer on citrus cultivation, and to place his services at the disposal of the farming community, in so far as his duties permit. Applications, which will be dealt with in order of date, should be addressed to the Director of Land Settlement, Salisbury. No fee will be charged for Mr. Farmer's services.

Departmental Bulletins

The following Bulletins, consisting of reprints of articles which have appeared in this Journal, are available for distribution free of charge to applicants in Rhodesia :—

AGRICULTURE.

- No. 97. Hints on Irrigation (Pipes and Pipe-laying), by W. Martin Watt, Agricultural Engineer.
- No. 2. The Possibilities of Rhodesia as a Citrus Growing Country, by R. McIlwaine, M.A., LL.B.
- No. 81. Possibilities of Export Trade in Oil Seeds, by H. Godfrey Mundy, F.L.S.
- No. 61. Requirements in sending Botanical Specimens to the Department for Identification.
- No. 71. Report of Forestry in Southern Rhodesia, by J. Sims, F.H.A.S.
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HANDBOOK OF TOBACCO CULTURE for
Planters in Southern Rhodesia. Sold by the Depart-
ment of Agriculture. 2/6.

Employment on Farms.

The Department of Agriculture receives numerous enquiries from persons of varied attainments, age and financial position for openings on farms, as managers, assistants and learners, requiring remuneration on corresponding scales, or willing to give services in return for keep.

In order that work may be found for the above and needs of farmers met, applications are invited from both employers and persons seeking employment. Applications are also invited from artisans, such as masons, bricklayers, carpenters, fencers, well sinkers, concrete workers, and the like who may desire work on farms. In cases where employers have obtained the labour they require, or applicants for employment have found work, it is requested that notification be at once sent to the Department of Agriculture, in order that unnecessary correspondence be avoided.

Replies to the following applications should be addressed to the initials of the advertisers, c/o Director of Agriculture, who will forward the letter to the party referred to.

SITUATIONS VACANT.

W. M. W.—Partner with a little capital to develop farm situated in Figtree district. Terms to be mutually arranged.

C. & E. K.—Vacancy for a man wishing to learn tobacco growing and general farming. Applicant will be required to invest a small amount of capital.

H. E. O. T.—Farm assistant for tobacco and general farming. Must have experience.

J. F. V.—Young gentleman to learn farming for board and lodging. If experienced, share in crop.

G. C. W.—Expert vegetable gardener for mine compounds. Liberal terms to competent man.

SITUATIONS WANTED.

J. B.—Would like to work on shares. Seven years' experience of general farming in Cape Province.

C. H.—Twelve months' general farming experience in Rhodesia. Like to go in on share principle. Will work for board and lodging if chance given to learn tobacco growing.

K. A. K. S.—Understands tobacco growing, and has knowledge of general farming. Has small capital, and prepared to go in on share principle.

G. A. M.—Nine years' experience at farming in Rhodesia. Thorough knowledge of buildings, tanks, etc.; would like management of a stud farm.

M. A. M.—English and Canadian experience of general farming and stock. Prepared to manage an estate or dairy farm. Understands culture and curing of tobacco. Prefers to go in on share principle, but with small salary. Can invest a small amount of capital.

E. K. B.—Two years' training at the Colonial College of Agriculture in England, also two years' experience on a Canadian farm.

W. B.—Fifteen years' experience of stock and general farming in Australia. Thoroughly understands stud stock and sheep. Has had experience in Transvaal.

C. A. B.—Understands general and ostrich farming. Married; one child.

C. A. C.—Eighteen months' farming experience. Working knowledge of maize and general farming. Can handle cattle and sheep. Age 25.

G. G. H.—Thorough knowledge of tobacco growing and curing and general farming.

A. H.—Six months' experience of farming in Queensland. Prepared to work in return for board and lodging.

R. W. K.—Age 18, brought up on farm, requires employment as farm assistant.

W. F. L. L.—An English farm pupil, stock and general, for one year.

B. M.—As manager of tobacco farm.

B. O. M.—As manager of tobacco farm.

G. N.—Thorough experience in bacon curing, etc.

J. S.—Qualified Turkish tobacco grower and flue curer.

R. C. H. W.—Would like to get on a farm to gain experience.

H. L. W.—Thoroughly qualified in tobacco growing and curing, and management and training of oxen. Would like to work on shares.

R. C. M.—Thorough knowledge of tobacco growing and curing.

E. A.—As farm manager; married; experienced in fruit, cattle and general farming. Experience 20 years in California, Ceylon, Transvaal and Rhodesia. Excellent references.

T. M. M.—On a ranch. Thorough knowledge of cattle; some knowledge of dairying and tobacco.

M. A. G.—As farm manager; mixed farming; in North-Western Rhodesia if possible. Competent well-sinker; can handle natives. Eighteen years' South African experience. Single; 36.

C. A.—Age 18. Employment on farm to gain experience. Two years dairying and fruit farming in Cape Province.

R. D. B.—As assistant on farm. Five years' general experience. Will work six months on trial at £5 per month, board and lodging.

C. C. D.—Tobacco growing and curing and general farming. Two years' tobacco experience.

J. W. D.—Assistant on farm. General experience.

M. H. M.—Lady, experienced in poultry and dairying, desires position on shares or other terms.

F. W. T.—Four years' experience in tobacco growing, wants position as manager or on shares. First-class references.

C. V. T.—Thorough knowledge of general farming.

E. V. W.—As farm manager. Thorough knowledge of stock. Married; wife capable of taking charge of poultry and dairying.

S. N. W.—General farming, tobacco, and cattle. Prepared to work on salary and share in profits.

H. G.—Age 30; married; nine years' experience in German West Africa, two years' in Rhodesia; general and dairy farming.

NOTICE

The Agricultural Journal of Southern Rhodesia

is issued by the Department of Agriculture, and can be obtained upon application to the Editor. The Annual Subscription, which must be paid in advance, is 5/-, and payment may be made by any means other than by stamps.

Persons residing outside Southern and Northern Rhodesia and the Union of South Africa, may become subscribers by paying 4/- in addition to the subscription, to cover postage.

If payment is made by a cheque drawn on a bank outside Rhodesia, commission must be added.

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Date,.....19.....

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"Rhodesia Agricultural Journal,"  
Salisbury.

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## Government Notices.

### ANIMALS DISEASES AMENDING ORDINANCE, 1911.

Ordinance No. 2, 1911.]

[Promulgated 17th March, 1911.

BE IT ENACTED by the Administrator of Southern Rhodesia, with the advice and consent of the Legislative Council thereof, as follows :—

1. So much of the "Animals Diseases Consolidation Ordinance, 1904" (hereinafter referred to as the said Ordinance) and of any other law as may be repugnant to or inconsistent with the provisions of this Ordinance is hereby repealed.

2. The Administrator may, on the outbreak of a destructive disease, or when there is suspicion of the existence of such disease, declare an area around and including the place where such disease exists, or is supposed to exist, actively infected for the purpose of this Ordinance.

3. Whenever an area shall have been declared infected in terms of the last preceding section, the Administrator may, for the purpose of suppressing or controlling disease, cause such fences to be erected along the boundaries of or across any farms or land situated in such area as he may deem necessary.

4. (1) If the landowner shall not pay the cost of erecting any fence as aforesaid upon completion thereof, the cost shall be defrayed in the first instance out of moneys provided by the Legislative Council.

(2) When any fence erected as aforesaid runs along the boundary of a farm, the cost of the erection of such fence shall, if not sooner repaid, be repaid, together with interest at the rate of £5 per centum per annum, by equal yearly instalments commencing two years after the fencing is completed, such instalments being so calculated and fixed that the said cost and interest shall be wholly repaid within a period of fifteen years from the date when the first instalment became due.

(3) Such repayment shall be made by the adjoining landowners whose land has been divided by the fence. Each such landowner shall pay one-half the cost of the dividing fence and interest as aforesaid. When the adjoining land is a native reserve, or a portion of such reserve, the one-half of the cost shall be paid from funds in the local Treasury of the British South Africa Company.

(4) When any fence as aforesaid shall be erected within, and not on and along, the boundaries of any farm, the cost shall be paid from the funds of the local Treasury of the British South Africa Company, and the fence when no longer necessary for the purpose for which it was erected may be removed by the British South Africa Company; provided that the landowner shall have the right to purchase such internal fence at a price representing the total cost of such fence.

(5) The term "owner" shall mean (a) the person registered as such in the office of the Registrar of Deeds, (b) the British South Africa Company in respect of native reserves, and (c) the local authority in respect of municipalities.

5. Where the bed of a stream or river lies immediately between or constitutes the boundaries of land owned by private owners, the fence may be erected on one or other bank of the river or stream and across it, or partly



on one bank, across it, and partly on the other bank, in such manner as may be agreed upon by the owners whose lands are separated by the said stream or river. The Administrator may call upon the said owners to agree to the position of the said fence on or before a date fixed by him, and, should they fail to do so, he may cause such fence to be erected without further reference to the said owners. For the purposes of repayment, such fence shall be considered as dividing the lands of adjoining owners, and half the cost shall be recoverable from each owner whose lands are separated by the said stream or river.

6. The Administrator may call upon any owner whose land has been fenced in terms of section 3 or 12 to provide sufficient security for the payment of any sums that may be due to the British South Africa Company in its local Treasury in respect of such fence. If the owner shall fail or refuse to provide such security, the Administrator may cause a notice in writing to be sent to the Registrar of Deeds of the amount due by such owner, and the Registrar shall make an entry thereof in respect of the land fenced. Such entry shall constitute an hypothecation of the land, ranking from the date on which the entry was made and for the amount therein stated; provided that the Registrar may pass transfer of land so hypothecated if the transferee agrees in writing that any sums due and unpaid shall remain and be registered as a charge against the said land.

7. When any land held under lease or permit of occupation has been fenced in terms of this Ordinance, during the term of such lease or permit the lessee or permit holder shall pay to the proprietor of such land yearly, during the continuance of the lease or permit of occupation, interest at the rate of £5 per centum upon so much of the cost of the fence as the proprietor is liable for, and such payment shall be made with the rent of the land, and shall be deemed in law to be part of such rent.

8. Any tenant or holder of land under a permit of occupation having a right to purchase such land at a fixed price shall, on completion of the purchase, pay to the proprietor, in augmentation and as part of the purchase money, any sum paid by such proprietor for the fencing of such land, and shall become and be liable to repay to the British South Africa Company in its local Treasury such sums as remain unpaid, as the same become due and payable in terms of this Ordinance.

9. Where in the case of any local authority the title to land provides that upon the sale thereof the British South Africa Company shall be entitled to receive a proportion of the purchase price, the local authority shall be entitled to deduct from the purchase price of land sold any debt due or amount paid by it in respect of fences on the land so sold erected under this Ordinance.

10. The provisions of sections 14 and 15 of the "Fencing Ordinance, 1904," in regard to repairs shall, *mutatis mutandis*, apply to fences erected in terms of this Ordinance.

11. Where a fence crosses any road used as of right by the public or by any neighbouring landowner, a properly constructed swing gate shall be placed at the point of crossing.

12. Any person opening such gate, except for the purpose of passing through, or omitting to close such gate after having passed through, and any person damaging such gate and omitting to immediately repair such damage shall be liable to a fine not exceeding £10, or in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

13. The Administrator may, for the purpose of the more effective prevention or control of disease, apply the provisions of this Ordinance in respect of fencing to municipalities and townships and such land adjoining as may be deemed expedient, and to places within a radius of ten miles of an area declared actively infected in terms of section 2 hereof, if, owing to the number of cattle in such places, or other causes, it appears expedient.

14. (1) The owner or proprietor of the land along the boundaries of which fences have already been erected by the British South Africa Company for the purpose of preventing the spread of

African Coast Fever in cattle shall be and is liable to repay to the British South Africa Company in its local Treasury one-half of the cost of so much of the fence as may be along the boundary of such land. The provisions of sections 7 and 8 of this Ordinance shall apply in the case of land held under lease or permit of occupation along the boundaries of which fences have already been erected. The British South Africa Company may remove any such fence already erected which is within and not on or along the boundaries of any land when no longer necessary for the purposes for which it was erected.

- (2) Any payment due in respect of any such fence may be made as provided by section 4 of this Ordinance, and under the like conditions as to security for such payment as are prescribed under section 6.

15. Within any area declared by the Administrator to be actively infected under the provisions of section 2, or to which the provisions of this Ordinance shall have been applied in terms of section 12, the Administrator may for the purpose of more effectively preventing the spread of disease cause to be constructed on any land a dipping tank and any structures incidental thereto or other appliances for the dipping of stock, and may recover the expenditure incurred from the owner of the land on which such tank, structures or appliances have been constructed. The cost of such tank, structures or appliances shall be paid on the same terms and under the same conditions as are applicable to boundary fences under sections 4, 6, 7 and 8 of this Ordinance.

16. In addition to any penalties that may be imposed under the said Ordinance or any amendment thereof, or under any regulations framed thereunder for the unlawful movement of cattle, the Court of the Magistrate before which the case is tried or the High Court in the like instance may direct the confiscation of any cattle unlawfully removed, and such cattle, if infected with disease or likely to convey infection, shall be destroyed without compensation. Should there be no danger of infection the Administrator may order such cattle to be temporarily kept at any spot denoted by him and then sold. The proceeds of any such sale shall be paid to the British South Africa Company in its local Treasury.

17. Section 11, sub-section (1) of the said Ordinance is hereby repealed, and in lieu thereof the following shall be the section :—

“Should any Inspector, Sub-Inspector or any person specially authorised by the Administrator to carry out the provisions of this Ordinance know or suspect that any animal is infected with any destructive disease such Inspector, Sub-Inspector or other authorised person may forthwith place such animal in quarantine, together with such land as is necessary for its isolation, and such animals as have been or are suspected of having been in contact with such animal or with infection. Notice of such quarantine shall be given in writing to the owner or custodian of such animal and to the Magistrate of the district, and shall remain in force for such time as the Chief Inspector or Controller of Stock may direct, unless the Administrator shall sooner, if he thinks fit, issue the notice referred to in sub-section (2) of section 5. A copy of the notice of any such quarantine shall be posted at the office of the Magistrate, and shall be inserted by the Magistrate in some newspaper, if any, circulating in the district.”

18. Section 16 of the said Ordinance is hereby repealed, and in lieu thereof the following shall be the section :—

“Any Government Veterinary Surgeon or any person thereto authorised by the Controller of Stock, Chief Inspector or by a Magistrate may enter any land, building, kraal or enclosure for the purpose of inspecting animals. Should any animal be found to be infected with any destructive disease, or should such infection be reasonably suspected, he may quarantine such animals as in this

Ordinance provided, and may order the proper disinfection of any building, kraal or enclosure in which such animal is or may recently have been, and the furniture and fittings thereof. Should it be impossible to properly disinfect such stable, kraal or enclosure, furniture or fittings in any of them, he may order the destruction thereof; provided that no building, kraal or enclosure shall be destroyed unless the owner consents thereto in writing, or failing such consent, the Administrator orders that such destruction be carried out."

19. Section 22, sub-section (1) of the said Ordinance is hereby amended by the addition of the following words after the word "obtained" in the twelfth line of the said sub-section, "and any person receiving or taking delivery of any animals without having ascertained that such permit has been obtained."

20. This Ordinance may be cited as the "Animals Diseases Amending Ordinance, 1911," and shall be read as one with the "Animals Diseases Consolidation Ordinance, 1904," and the "Animals Diseases Amendment Ordinance, 1910."

No. 216 of 1912.]

[4th July, 1912.]

#### REMOVAL OF CATTLE TO PRESCRIBED AREAS.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that, notwithstanding the provisions of Government Notices Nos. 47 and 254 of 1910 and 51 of 1911 the removal of cattle to any point within twenty miles of the border of the territory defined by the Crocodile, Shashi and Ramaquabane Rivers, to the south-east beacon of Mphoeng's extension on the last named, may be allowed until further notice under permit from the Chief Inspector for the purposes of grazing and watering.

No. 50 of 1912.]

[8th February, 1912.]

#### AFRICAN COAST FEVER.

*Regulations regarding the movement of cattle and the prevention and suppression of disease.*

1. UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notices Nos. 329 of 1910 and 308 of 1911 and make the following provisions in lieu thereof:—

2. The various districts of Southern Rhodesia are hereby declared an area infected with African Coast Fever for the purposes of section 5 (2) of the aforesaid Ordinance, and, save as hereinafter set out, all movement of cattle within the said districts is prohibited until further notice.

#### *General Movement.*

3. For the purpose of section 22 (1) of the said Ordinance, the following shall be regarded as places within the boundaries of which the movement of cattle may be allowed without special permission:—

- (a) Single farm.
- (b) Two or more adjoining farms, farmed together under one management and situated within one cattle transport area.
- (c) An area, the property of one owner, enclosed by a substantial fence.
- (d) For grazing purposes, an area within a radius of four miles of native kraals situated on unalienated land or in reserves, save and in so far as such area includes any private land.

The sites of such kraals shall be deemed to be the places where they are situated at the date of promulgation of these regulations.

4. Notwithstanding the provisions of the last preceding section, or of section 9 hereof, the Chief Inspector may, on the outbreak of disease, or for such other cause as may be deemed expedient, direct the isolation or quarantine of cattle on a limited area of the aforesaid places.

5. The movement of cattle from place to place may be permitted under the special permission, in writing, of an Inspector, Sub-Inspector, or other officer or person duly authorised by the Administrator to grant such permission.

6. No permission as aforesaid shall permit the movement of cattle—

- (a) Without the written consent of the owners, occupiers or managers of occupied land, and in the case of native reserves, of the Native Commissioner of the district over which land or reserve such cattle will pass, whether along roads or otherwise; provided, however, that refusal to grant such consent shall be in writing, and provided further that if the Controller of Stock or the Chief Inspector shall consider that such consent is withheld without good and sufficient cause he may permit of movement without such consent.

If any such person mentioned above refuse to give consent or to state a reason for refusing to do so in writing, no valid objection shall be deemed to exist and movement may be permitted without such written consent.

- (b) Within a veterinary district as defined in the Schedule annexed hereto from one transport area to or through another without the consent of the Cattle Inspector in charge of such area.
- (c) From any veterinary district to or through another without the consent of the District Veterinary Surgeon of such district.

#### *Slaughter Cattle.*

7. Cattle moved to any centre for slaughter under the provisions of these or any other regulations shall, on arrival, be immediately taken to such quarantine area (if any) as is provided for the purpose and immediately branded with the letters "V.D." on the near hip.

8. Cattle admitted to a quarantine area in terms of the last preceding section shall be slaughtered within twenty-one days of the date of admission, and shall not be permitted to leave the same except for the purpose of being slaughtered at the appointed abattoir, and if found outside such area, except for the said purpose, may be destroyed on the order of the Chief Inspector or Controller of Stock; provided, however, that the Chief Inspector may allow the removal of cattle from such an area under such conditions as he may prescribe.

#### *Transport Cattle.*

9. The use of cattle for draught purposes is prohibited except :—

- (1) Within the boundaries of the places defined in section 3 (a), (b) and (c) hereof.
- (2) Within the boundaries of areas already fixed for the use of cattle for draught purposes in terms of regulations published under Government Notice No. 329 of 1910, or such other areas as may be fixed by the Administrator.

10. Notwithstanding the provisions of section 9, no permit shall authorise the working of cattle

- (a) which are not clearly and distinctly branded with the registered brand of the owner;
- (b) in any wagon or vehicle which shall not have the owner's name and address legibly and permanently inscribed on the right side thereof.

11. No wagon or other vehicle drawn by oxen shall be moved from one cattle transport area into another without the permission of the Cattle Inspectors concerned, and under such conditions as they may impose.

#### *General Provisions.*

12. On the outbreak or suspected outbreak of disease, the Administrator may declare an area of infection around and embracing the place of outbreak or suspected outbreak, and a further area or areas around such area of infection as a guard area, whereupon all movement of cattle into and from place to place within such area or areas shall be immediately suspended, except as hereinafter provided.

#### *A.—In areas of infection and guard areas:—*

- (1) Cattle in transit by rail may be moved through such area.
- (2) Cattle from beyond the borders of Southern Rhodesia may be detained within such area or areas *en route* to destination.
- (3) Cattle for *bona fide* farming, dairy and slaughter purposes may be moved into such area or areas by permission of the Chief Inspector and under such conditions as he may impose.

#### *B.—In guard areas only:—*

Cattle may be moved into and from place to place within such area under the conditions of section 6 hereof.

13. The removal of green forage, hay, fodder, bedding reeds, manure or of such other articles as may be reasonably supposed capable of conveying infection, shall be prohibited from areas of infection, save and except with the special permission of the Administrator.

14. Whenever an area shall have been declared under section 12 hereof, every person within such area, or within such further area as may be specified by Government Notice, owning or in charge of cattle shall, upon the death or slaughter because of disease, suspected disease, or accident, of any such cattle, immediately report such occurrence through the nearest Cattle Inspector, Native Commissioner or Police Officer to the District Veterinary Surgeon.

15. Notwithstanding the provisions of these regulations, it shall be competent for the Chief Inspector of Cattle to authorise and direct the movement of cattle for the purposes of isolating, dipping, quarantine, or any other such objects as may be deemed necessary to prevent or suppress an outbreak of disease.

16. Whenever an area shall have been declared an area of infection or guard area in terms of section 12 hereof, any person who shall allow any cattle to stray or be otherwise removed, except as provided for in these regulations, from any one place within such area to another place, or from a place outside of to a place within such area, shall be guilty of an offence against these regulations.

17. All cattle within the limits of the various commonages and townlands, areas of infection and guard areas as declared under section 12 hereof, or depastured on common grazing ground, shall be dipped or sprayed at least once in every three days, unless the Chief Inspector shall authorise the extension of the time between such dipping or spraying, or the entire suspension of the same.

18. In all areas of infection and guard areas sheep and goats shall be dipped at such periods as may be directed by the Chief Inspector.

19. Whenever the owner, occupier, or manager of a farm shall adopt means of cleansing cattle running thereon, either by spraying, dipping, or by any other method, the Chief Inspector may order any natives or other persons having cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district within which the farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

20. All permits for the removal of cattle issued under the provisions of the said Ordinance or of any regulations framed thereunder shall specify legibly and clearly on the face thereof the place from and to which such cattle may be removed, the route by which they shall travel, the number and brands of such cattle, the time allowed for the journey, and such other particulars and conditions as it may be deemed expedient to provide.

21. No permit issued for the movement of cattle shall be taken to authorise any trespass in connection with such movement.

22. Notwithstanding the provisions of these regulations, it shall not be lawful for any owner of cattle to allow any such cattle to be on any road, public outspan, commonage, or any property other than that of the owner, unless they are free from ticks or unless they have been effectively cleansed by dipping, spraying or other process, within fourteen days of being allowed on such road or other place. Any beast having ten or more ticks on it shall not be considered free from ticks.

23. Any person contravening the provisions of these regulations or the conditions set out in permits issued thereunder, shall, where no higher penalty has been by the said Ordinance or any other law provided, be liable in respect of each offence to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for a period not exceeding three months.

#### SCHEDULE "A."

##### VETERINARY DISTRICTS OF SOUTHERN RHODESIA.

##### (1) *Salisbury.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912:—

32. Battlefields; 33. Hartley and Gatooma; 34. Gadzenia Station; 35. Makwiro Station; 36. Norton Siding; 37. Hunyani Tank; 38. 1645½ Peg B. & M. & R. Railways; 39. Salisbury A.; 40. Salisbury B.; 41. Salisbury C.; 42. Salisbury D.; 43. Arcturus; 44. Bromley; 45. Marandellas North; 46. Marandellas South; 48. Headlands Station; 49. Junction Mazoe and Lomagundi Railways; 50. 23-Mile Peg, Lomagundi Railway; 51. Passaford Station; 52. 35-Mile Peg, Lomagundi Railway; 53. Gwibi Tank Halt; 54. Banket, Lomagundi; 55. Eldorado, Lomagundi; 56. Selby Siding; 57. Mazoe; and 58. Kimberley Reefs.

##### (2) *Bulawayo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912:—

1. Plumtree; 2. Marula Siding; 3. Figtree; 4. Westacre Junction; 5. Bulawayo Area; 6. Heaney Junction; 7. Bembesi Station; 8. Insiza North; 9. Insiza South; 10. Shangani North; 11. Shangani South; 14. Redbank; 15. Nyamandhlovu Station; 16. Malindi Station; 17. Wankies Area; 18. Matetsi Siding; 19. Matopo Terminus; 20. Sabiwa Siding; 21. Gwanda Station; 22. West Nicholson; 23. Belingwe; 29. Essexvale and Balla Balla Areas; 60. Stanmore Siding Area; 61. Filabusi Area.

##### (3) *Gwelo.*

An area comprising the following areas for transport cattle published under Government Notice No. 11 of 1912:—

12. Somabula Siding; 13. Gwelo Station; 24. Selukwe Area; 25. Surprise Area; 26. Indiva Siding; 27. Lalapanzi; 28. Iron Mine Hill Siding; 29. Umvuma Siding; 31. Que Que Station.

##### (4) *Umtali.*

An area comprising the native districts of Umtali, Melsetter, Makoni and Inyanga.

No. 189 of 1912.]

[6th June, 1912.

## REMOVAL OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that, notwithstanding the provisions of section 12 of Government Notice No. 50 of 1912, the removal of cattle for purpose of obtaining food or water may be permitted at the discretion of the Chief Inspector, and under such conditions as he may prescribe.

No. 175 of 1912.]

[30th May, 1912.

## AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that, notwithstanding the provisions of Government Notices Nos. 47 and 254 of 1910 (and 51 of 1911), the removal of cattle to within that portion of the prescribed areas westward of the Salt River, Tuli district, may be allowed under permit from the Chief Inspector, for the purposes of grazing and watering.

No. 233 of 1912.]

[11th July, 1912

## AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw Government Notice No. 127 of 1910, in so far as it relates to the Protectorate of Nyasaland, and further do hereby prohibit the introduction into Southern Rhodesia of cattle from Nyasaland until further notice.

No. 252 of 1912.]

[1st August, 1912.

## AFRICAN COAST FEVER. TRANSPORT AREAS.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 9 of the regulations published under Government Notice No. 50 of 1912, declare the areas described in the subjoined Schedule as areas within which the use of cattle for draught purposes may be permitted.

## SCHEDULE.

62. *Mazi Siding.*

An area including the farms Cheronga, Highfield, Kirbyvale, Mona, Dyffryn, Maidstone, Harrisonville, Recondite and Crofton.

63. *Inyazura Siding.*

An area bounded by and including the following farms:—Inyamapamberi Outspan, Tiny, Marngu, Mount Zonga Commonage, Mount Zonga, Kwapassi Outspan, Orowati, Tableview, Tsungwesi Source, Tsungwesi Ridge, Everton, and the unsurveyed land lying east of a line drawn from the north-west beacon of Everton to the south-west beacon of Tiny.

64. *Igusi Siding.*

An area bounded by and including the following:—Winter, Spring, Eland, Buda Block No. 2, Grant, Batley, Groote Schuur No. 2, Frankland, Fry's Farm, Goshen Flat, Uhlanulu, Ubusiga, Ughwindhla, Ihlobo, Woodlands, Teakdale, Barn Park, Forest Hill, Groote Schuur, Majindan, Mvuba, Barwon, Campaspe, Esperanza, Merryland and Maraposa.

65. *Gwaai Area.*

An area bounded by the Malinda area, the Bechuanaland border, the Plumtree, Nyamandhlovu, Igusi Siding, Bembesi, Shangani North and Gwelo areas, from the most northerly point of the latter down the Shangani River to the western boundary of the Shangani Reserve, thence in a southerly direction along the same to the Gwampa River and down this river to the Malinda area.

No. 82 of 1913.]

[13th March, 1913.]

## AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel Government Notices Nos. 338 of 1912 and 13 of 1913, and, in terms of section 12 of Government Notice No. 50 of 1912, declare the following areas of infection and guard areas for the purposes of the said Ordinance:—

## (1) NATIVE DISTRICTS OF UMZINGWANE, BULAWAYO, MATOBO AND BUBI.

(a) *Areas of Infection.*

The farms Alnwick, Nyorka, Induba, Collaton, Irene, Maboqutwaneni Outspan, the portion of the Essexvale Estate known as the North Paddock, which adjoins the farm Ballarat on its eastern boundary, and the fenced sub-division of Bulawayo Commonage, which includes the township, suburbs and Hillside.

(b) *Guard Area.*

An area bounded by and including the following farms: Lochard Block, Half Ration Ranche, Chilton, Fincham's, Inyati Reserve, Huntsman, Robert Block, Induna, Waterfall, Dingaan, Rouxdale, Fundisi, Helenvale (excluding farms Nos. 1, 3 and 16), Slights, Bilars, Stonycroft, Craiglee, Blewbonny, Ireland, Welcome, Springvale, Vriegezicht, Paul's Rest, McGeer's Luck, Centenary Mission, Outspan No. 3, Anglesea, Mineral King, World's View, Matopo Block, Mission Farm, Brethren in Christ, Absent, that portion of the Matopos lying north of a line drawn from the south-eastern beacon of Absent to the north-western beacon of Longfield, The Range, Clarke's, Swaithe's, Limerick, Pioneer's Rest, Hayhill, Reitfontein, Bradford, Hamilton, Mayfair, York, Indina, Rathline, Westondale, Sub-division A, Fochabers, Kodhwayo, Zimbili and Lochard Outspan.

## (2) NATIVE DISTRICT OF SALISBURY.

(a) *Areas of Infection.*

Salisbury Commonage, the southern portion of the farm The Grange.

(b) *Guard Area.*

The farms Reitfontein, the northern portion of The Grange, Gletwyn, Sternblick, Chikurubi, Greendale and Nursery.

## (3) NATIVE DISTRICT OF UMTALI.

(a) *Area of Infection.*

Umtali Commonage.

(b) *Guard Area.*

The farms Devonshire, Quagga's Hoek, Fern Valley and Fern Hill.

No. 122 of 1913.]

[24th April, 1913.]

## AFRICAN COAST FEVER.

I DO hereby, in terms of section 12 of the regulations published under Government Notice No. 50 of 1912, declare the following area of infection and guard area for the purposes of the said regulations:—



(a) *Area of Infection.*

Hatfield Estate and Hatfield Estate Plots, in the native district of Salisbury.

(b) *Guard Area.*

The following farms in the native district of Salisbury:—Makabusi Outspan, Hopley, Saturday Retreat, Odar Outspan, Stoneridge, Eyrecourt, Boutelle, Twentydales, Glenwood, Adelaide, Ventersburg, Makabusi, Gallagher's, M.T.C., Prospect, Ardbennie Township, Waterfall, Spreckley, Retreat, Eyerston, Bunkershill, Adair, Epworth and Godavery.

No. 123 of 1913.]

[24th April, 1913.

## AFRICAN COAST FEVER.

WHEREAS there has been an outbreak of a destructive disease, to wit, African Coast Fever, on the Hatfield Estate Plots, I, under and by virtue of the powers vested in me by the "Animals Diseases Amending Ordinance, 1911," do hereby declare the following area in the native district of Salisbury to be an area actively infected with African Coast Fever for the purposes of the said Ordinance:—

An area bounded by and including the following farms:—Makabusi Outspan, Hopley, Saturday Retreat, Odar Outspan, Stoneridge, Eyrecourt, Boutelle, Twentydales, Glenwood, Adelaide, Ventersburg, Makabusi, Gallagher's, M.T.C., Hatfield Estate, Hatfield Estate Plots, Prospect and Ardbennie Township.

No. 129 of 1913.]

[1st May, 1913.

## AFRICAN COAST FEVER.

I DO hereby, in terms of section 12 of the regulations published under Government Notice No. 50 of 1912, declare the following area of infection and guard areas in lieu of the areas published under section (1) of Government Notice No. 82 of 1913:—

- (1) THE NATIVE DISTRICTS OF BULAWAYO, MATOBO, BULALIMA-MANGWE AND BUBI.

*Area of Infection.*

The farms Collaton, Irene, Mabogutwaneni Outspan, and within a radius of four miles of Inyamba's Kraal on Alnwick Estate.

*Guard Areas.*

(a) An area bounded by and including the following farms:—Alnwick Estate, Joe's Luck, Honeybird Kop, Doublevale, Maritzburg, Springvale, Outspan No. 3 Tati Road, Vregevecht, La Concorde, Lucydale, Lonsdale, and the fenced north-western section of Westacre Creek.

(b) The fenced sub-division of Bulawayo Commonage which includes the township, suburbs and Hillside.

(c) The farm Induba.

No. 143 of 1913.]

[15th May, 1913.

## AFRICAN COAST FEVER.

I DO hereby, in terms of section 12 of the regulations published under Government Notice No. 50 of 1912, declare the following area of infection and guard area for the purposes of the said regulations:—

(a) *Area of Infection.*

The farms Inodzi, Nyagari, Mountain Home (The B.), Umtali Mission and the Penhalonga Valley.

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(b) *Guard Area.*

That portion of the native district of Umtali bounded on the south by a line running from the Odzi River along the south-western boundaries of the farms Odzi Junction, Grange, and Premier Estate, and the northern boundaries of the farms Devonshire, Wiermouth and Umtali Commonage to the Anglo-Portuguese boundary.

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No. 145 of 1913.]

[15th May, 1913.

FEEES FOR DIPPING CATTLE AT GOVERNMENT DIPPING  
TANKS.

UNDER and by virtue of the powers vested in me by section 5, subsection 6 (e), of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that a charge of one penny per head will be made in respect of all cattle dipped at Government dipping tanks. Unweaned calves will be dipped free of charge.

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No. 342 of 1912.]

[24th October, 1912.

TRANSPORT AREAS.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby, in terms of section 9 of the Regulations published under Government Notice No. 50 of 1912, declare that, until further notice, the main road between the Tokwe and Ngesi Rivers is included in Area No. 24, Government Notice No. 11 of 1912, and the use of cattle for draught purposes is therefore permitted up to the Ngesi River upon the said road.

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No. 392 of 1912.]

[19th December, 1912.

TRANSPORT AREAS.

WHEREAS it is desirable to afford facilities for a limited amount of transport with cattle from Shangani Station to the Native Commissioner's Office in the Belingwe district, I, under and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," do hereby, notwithstanding any regulations to the contrary, authorise the Chief Inspector to permit of such transport under such terms and conditions in writing as to him may seem fit.

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No. 22 of 1913.]

[16th January, 1913.

MOVEMENT OF CATTLE.

IT is hereby notified for general information that, in terms of section 5 of the regulations published under Government Notice No. 50 of 1912, I do hereby authorise Native Commissioners and Assistant Native Commissioners to issue permits for the movement of cattle from place to place, in conformity with the provisions of the said regulations.

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No. 147 of 1913.]

[22nd May, 1913.

MOVEMENT OF CATTLE.

WHEREAS it is necessary to afford facilities for transport with cattle between the Gadzema Station: Banket, Lomagundi; and Eldorado, Lomagundi; areas as described in the schedule to Government Notice No. 11 of 1912, I, under and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," notwithstanding any regulations to the contrary, declare that the above-mentioned areas shall be regarded as one for the purposes of working draught cattle for a period of three months from date hereof.

No. 110 of 1908.]

[16th April, 1908.]

## IMPORTATION OF CATTLE.

UNDER and by virtue of the powers conferred on me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and repeal so much of the Regulations published under Government Notice No. 187, dated the 26th of July, 1906, as relate to the importation of cattle from the Colony of the Cape of Good Hope and the United Kingdom of Great Britain and Ireland, and make the following provisions in lieu thereof:—

1. The importation of cattle may be permitted from the Colony of the Cape of Good Hope and the Orange River Colony on the following terms and conditions—

- (1) A permit shall be required from the Chief Inspector which may contain such conditions as shall from time to time appear expedient.
- (2) Applications for permission to import shall be in the Form "A" attached hereto, and accompanied by a declaration in the annexed Form "B"
- (3) The importation of cattle with more than two permanent central incisor teeth shall not be permitted.
- (4) All importations shall be by rail and for the purposes thereof Bulawayo shall be regarded as the port of entry.
- (5) All cattle imported in terms of these Regulations shall on arrival at Bulawayo, Salisbury, or Umtali be removed to a place of quarantine under the supervision of an Inspector of Cattle, there to be submitted to such examination and tests as the Chief Inspector may direct. If such examination or tests disclose the existence of any destructive disease the cattle shall be immediately destroyed and the carcasses thereof disposed of in such manner as a Government Veterinary Surgeon may authorise or require. The Chief Inspector may permit of any examination or tests as aforesaid being dispensed with in the case of cattle in transit by rail for any place beyond the boundaries of Southern Rhodesia.
- (6) All expenses or losses incident to quarantine, examination, testing or destruction as aforesaid shall be borne by the owner of the cattle.

2. The importation of cattle from the United Kingdom of Great Britain and Ireland may be permitted under the following terms and conditions—

- (1) Importation shall be through and direct from the coast ports of the Cape Colony, and there shall be a consignment note or other satisfactory evidence that cattle so imported have come direct from Great Britain or Ireland.
- (2) The provisions of sub-sections (5) and (6) of section 1 hereof shall apply to importations in terms of this section.

3. No person shall import cattle in terms of these Regulations except for his own use, provided however that permission may be granted to import for others on the applicant disclosing the name of the person or persons for whom he proposes to act.

4. Any person introducing cattle in contravention of these Regulations, or failing to comply with any conditions attached to permits to import, or furnishing applications, declarations, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, testing, destruction or disposal of carcasses, shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of

payment to imprisonment with or without hard labour for any period not exceeding six months, unless higher or greater penalties shall have been provided for such offences by the "Animals Diseases Consolidation Ordinance, 1904," provided however that the penalties imposed by these Regulations shall not exempt any cattle from destruction in terms of the aforesaid Ordinance.

## ANNEXURE "A."

## APPLICATION FOR CATTLE IMPORTATION PERMIT.

1. Applicant's Name and Address.....
2. Number and Class of Cattle to be imported.....
3. Area or Farm and District where Cattle are at present located.....
4. Area or Farm and District to which Cattle are to be moved.....

Applicant's Signature.....

Date.....

Application.....

Permit No.....

## ANNEXURE "B."

I, ..... residing on the farm ..... in the district of ..... do solemnly and sincerely declare that the ..... (number in writing) animals also enumerated below have been in my possession since birth, and that Lungsickness (Contagious Pleuro-Pneumonia) has not existed amongst any of my cattle, nor on my farm, during the last four years, and that no other bovine disease scheduled under the Diseases of Stock Act, 1911 (Union of South Africa) has existed amongst any of my cattle, nor on my farm, during the last twelve months, and that these animals have never been exposed for sale in any public market or stock fair.

Number of Animals ..... Bulls ..... Heifers .....

Breed .....

Seller's Name and Address .....

Purchaser's Name .....

Place in Southern Rhodesia to which animals are being sent .....

And I make this solemn declaration conscientiously believing the same to be true.

Declared to at ..... on this ..... day of.....  
before me,

Resident Magistrate for the District of .....

No. 127 of 1910.]

[2nd June, 1910.]

IMPORTATION OF CATTLE FROM NORTH-EASTERN  
RHODESIA.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that the importation of cattle from North-Eastern Rhodesia may be permitted under the following terms and conditions:—

1. The permission of the Chief Inspector of Cattle be first had and obtained.

2. All cattle shall be introduced by way of the town or port of Feira, which is hereby declared a port of entry.

3. All applications for permission to import shall be accompanied by—

(1) A certificate by a Government Veterinary Surgeon of the territory of origin that—

a. the districts from which they come and through which they pass are free from contagious diseases of animals;

b. the animals in respect of which the application is being made have been examined and are free from any destructive disease.

4. All cattle shall on entry be taken to a quarantine area defined by the Chief Inspector of Cattle, and shall remain in quarantine for such period as the Chief Inspector of Cattle shall direct, not less than three months.

5. Cattle at Feira at the date of promulgation of this notice may be removed to the quarantine area on permission of the Chief Inspector of Cattle without the certificates detailed above.

6. Any person found introducing cattle in contravention of these regulations, or failing to comply with any of the conditions attached to permits to import, or furnishing applications, certificates, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, etc., shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months, unless higher or greater penalties have been provided for such offence by the "Animals Diseases Consolidation Ordinance, 1904"; provided, however, that the penalties imposed by these regulations shall not exempt any cattle from destruction in terms of the aforesaid Ordinance.

## SCHEDULE "A."

## 1. CERTIFICATE UNDER SECTION 3. (1), a.—

I hereby certify that I have examined the following cattle belonging to Mr. ....

..... Cows and heifers,

..... Calves,

..... Oxen and bulls,

and that the districts from which they come and through which they will pass in this territory *en route* to Southern Rhodesia are to the best of my knowledge free from all destructive diseases of cattle.

Signature .....

Government Veterinary Surgeon.

## 2. CERTIFICATE UNDER SECTION 3. (1), b.—

I hereby certify that I have examined the following cattle belonging to Mr. ....

..... Cows and heifers,

..... Calves,

..... Oxen and bulls,

In my opinion these animals are free from all destructive diseases.

Signature .....

Government Veterinary Surgeon.

No. 60 of 1913.]

[13th February, 1913.

## IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby authorise the importation from the Kingdom of the Netherlands of cattle required for *bona fide* breeding purposes; provided, however, that such importation shall *mutatis mutandis* be subject to the provisions of Government Notice No. 110 of the 16th April, 1908, relating to the importation of cattle from the United Kingdom of Great Britain and Ireland.

No. 47 of 1913.]

[6th February, 1913.

## IMPORTATION OF SHEEP, GOATS AND PIGS.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare that the introduction of sheep, goats and pigs against which no prohibition exists may be permitted from overseas, *via* the port of Beira, under the following conditions :—

- (1) Umtali shall be the port of entry;
- (2) that all such importations shall be in accordance with the regulations now in force or as amended from time to time;
- (3) that all animals shall be transferred directly after disembarkment to the railway trucks at Beira and conveyed thence to Umtali without leaving the said trucks.

## REGULATIONS UNDER WHICH STOCK IS ALLOWED TO PASS IN TRANSIT THROUGH THE TERRITORY OF THE MOZAMBIQUE COMPANY.

WITH reference to Government Notice No. 47 of 1913, the conditions under which stock is allowed to pass in transit through the territory of the Mozambique Company are published below for public information :—

(By "stock" is meant : horses, cattle, mules, donkeys, sheep, goats, pigs and dogs.)

I. The Customs official shall not allow disembarkation of any kind of stock at the port of Beira, when the said stock is in transit to Rhodesia, before a written permission from the Veterinary Department stating therein that disembarkation can take place.

II. In order to obtain this permit, mentioned in the foregoing article, the owner or his representative, who may be his Custom house broker, must have a written application for such permit, to the Chief Veterinary Surgeon of the Companhia de Mocambique, giving at the same time the following particulars, in writing :—

- (a) the number of heads of stock to be landed;
- (b) kind of stock;
- (c) what country the stock comes from, giving the name of the region;
- (d) the destination of such stock.

III. The importer, or his representative, must present at the same time the following certificates :—

- (a) one certificate from a Veterinary Surgeon of the country of origin of the said stock, stating that the region is free from any epizootic disease and that all the animals are also free from any such diseases;

- (b) a certificate signed by the captain of the ship which brought the stock, stating the number of deaths, if any, which have occurred during the voyage and if possible the cause of death.

IV. Having received the above-mentioned certificates and the information required by the foregoing articles, one of the Veterinary Surgeons of the Companhia de Mocambique, or their substitute, will proceed to inspect the stock on board the ship.

\* V. If during the inspection the Veterinary Inspector suspects the presence of any contagious disease, he will with the least possible delay investigate the case, and if his suspicions are confirmed and he has reason to believe that the disease in question might spread within the Territory of the Companhia de Mocambique, he shall refuse to issue the permit referred to in Article I. of this order.

VI. If after the inspection the Veterinary Surgeon or his substitute is satisfied that there is no danger in allowing such stock to pass through the Territory in transit, he shall issue the permit referred to in Article I. of this order.

VII. The Chief of the Customs Department, having received the permit referred to in Article I., shall allow disembarkation of the said stock under the following conditions :—

- (a) the only means by which any stock can be taken through the Territory is by rail;
- (b) that the stock should be taken directly after the disembarkation from the lighters to the railway station and placed in wagons or trucks. The windows and other openings for ventilation in the wagons should be covered up with wire netting, the meshes of which are small enough to prevent the entrance of biting flies, etc.;
- (c) having once been entrained, the animals will not be allowed to leave those wagons or trucks whilst they are in the Territory of the Companhia de Mocambique;
- (d) that any forage or hay that may be landed for the use of the stock to which this order refers, if not utilised for the purpose, will be burnt if between the time of disembarkation and the departure of the stock by train it has not been consumed, despatched or re-exported.

Any contravention of this order shall be considered a transgression, and as such be dealt with according to No. 3 of Article 74 of the Customs Regulations in force.

The authorities and every one whom it may concern to abide by and obey.

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No. 211 of 1910.]

[4th August, 1910.]

#### IMPORTATION OF CATTLE FROM NORTH-WESTERN RHODESIA.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that, notwithstanding the prohibition contained in Government Notice No. 89 of 1908, the importation of cattle from North-Western Rhodesia may be permitted under the following terms and conditions :—

1. The permission of the Chief Inspector of Cattle shall be first had and obtained.

2. All cattle shall be introduced (a) by rail via the Victoria Falls, or (b) by way of the town or port of Feira, which are hereby declared to be ports of entry.

3. All applications for permission to import shall be accompanied by a certificate by a Government Veterinary Surgeon of North-Western Rhodesia that—

- (a) the districts from which they come and through which they pass are free from contagious diseases of animals;
- (b) the animals in respect of which the application is being made have been examined and are free from contagious diseases of animals.

4. All cattle shall on entry be taken, where possible by rail, to such quarantine area and shall remain in quarantine for such period as the Chief Inspector of Cattle shall direct, but not less than three months.

5. Any person found introducing cattle in contravention of these regulations, or failing to comply with any of the conditions attached to permits to import, or furnishing applications, certificates, or other necessary documents known to be false in any material particular, or failing to comply with all lawful directions as to quarantine, examination, etc., shall be liable to a fine not exceeding £20 for each animal in respect of which such offence shall have been committed, and in default of payment to imprisonment with or without hard labour for any period not exceeding six months; provided, however, that the penalties imposed by these regulations shall not exempt from liability to penalties, forfeiture, or destruction, elsewhere provided for

#### ANNEXURE "A."

##### *Certificates under Section 3.*

(a) I hereby certify that I have examined the following cattle belonging to Mr. ....

.....cows and heifers,  
 .....calves,  
 .....oxen and bulls,

and that the districts from which they come and through which they will pass in this Territory *en route* to Southern Rhodesia are to the best of my knowledge free from all destructive diseases of cattle.

Signed.....  
 Government Veterinary Surgeon.

(b) I hereby certify that I have examined the following animals belonging to Mr. ....

.....cows and heifers,  
 .....calves,  
 .....oxen and bulls.

In my opinion these animals are free from all destructive diseases.

Signed.....  
 Government Veterinary Surgeon.

NOTE.—All numbers are to be expressed in words.



### IMPORTATION OF STOCK FROM THE PROVINCE OF THE CAPE OF GOOD HOPE.

WITH reference to Departmental Notice of 28th February, 1912, it is hereby notified that the said Notice is cancelled, and importation of stock will now be permitted, in terms of Government Notice No. 110 of 1908, from the Province of the Cape of Good Hope, with the exception of the following districts :—

|                  |                               |
|------------------|-------------------------------|
| Komgha           | Stockenström                  |
| East London      | Queenstown (Gwatyu Ward only) |
| Peddie           | Glen Grey                     |
| Victoria East    | Maclear                       |
| Kingwilliamstown | Elliot Slang River            |
| Stutterheim      | Wodehouse                     |
| Cathcart         | Barkly East                   |

No. 375 of 1912.]

[28th November, 1912.

### IMPORTATION OF POULTRY.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," as amended by the "Animals Diseases Amendment Ordinance, 1910," I do hereby declare and make known that the following regulations shall be in force and effect from date of publication hereof :—

(1) All poultry imported by rail shall be inspected by an Inspector or Sub-Inspector at Plumtree, Bulawayo or Umtali.

(2) Should any consignment of poultry shew symptoms of disease, or should such Inspector or Sub-Inspector have reason to believe that any disease exists in, or that infection is likely to be conveyed by such consignment, he may order the detention and isolation of the whole consignment for such period as he may deem necessary.

(3) The Chief Inspector may order the destruction of all poultry which he has reasonable grounds for believing to be diseased or likely to convey infection.

No. 391 of 1908.]

[17th December, 1908.

### BRANDS ORDINANCE AMENDMENT ORDINANCE, 1908.

UNDER and by virtue of the powers vested in me by the "Brands Ordinance, 1900," as amended by the "Brands Ordinance Amendment Ordinance, 1908," I do hereby cancel and withdraw the Regulations published under Government Notice No. 204 of 1900, and declare the following shall be in force in lieu thereof, from and after the 7th January, 1909 :—

1. The Registrar of Brands shall have his office in the Agricultural Department. With the exception of the Magistrate of Salisbury, the Magistrate in each district of Southern Rhodesia, and the Assistant Magistrate in each sub-district, shall be a deputy Registrar of Brands for the magisterial district or sub-district to which he is appointed. The offices of the Deputy Registrars of Brands shall be the offices of the several Magistrates.

2. (a) The form of application for registration of a brand shall be that marked "A" in the Schedule attached to this Notice.
- (b) The form of a certificate of registration shall be that marked "B" in the said Schedule.
- (c) The form of a transfer of a brand from one registered proprietor to another shall be that marked "C" in the said Schedule.
- (d) The form of a certificate of such transfer shall be that marked "D" in the said Schedule.

3. Each Deputy Registrar of Brands shall keep a register, in the form of Schedule "E" hereto, of all brands allotted within his district under the provisions of the Ordinance.

4. Save as hereinafter provided, every registered brand shall consist of two letters and a numeral of plain and uniform pattern; and the first of the letters shall indicate the magisterial district or sub-district in which the holding is situate on which the brand is to be used, and shall be placed above the numeral and letter comprising the brand, so as to be in triangular form.

5. One brand and no more shall be allotted to any person in one magisterial district or sub-district.

6. The size of the characters branded on stock shall not be more than three inches in height nor more than two inches in width.

7. An applicant for a brand shall be allotted the next vacant brand assigned to the district in which he is located, as set forth in Schedule "F" hereof.

8. Each Deputy Registrar shall keep a list of brands assigned to his district, for the inspection of applicants for brands.

9. There shall be payable to the Registrar or Deputy Registrar—

- (a) For every separate registration of a brand, 5s.
- (b) For every transfer of a brand, 5s.

10. All brands shall be imprinted on stock as follows:—

- (a) In the case of horses, mules or ~~or~~ donkeys, the first brand shall be imprinted either on the near side of the neck or near rump, and any second or subsequent brand shall (where there is sufficient space for such purpose) be imprinted on the same part of such animal, and at a distance of not less than one and a half inches from and directly underneath last imprint, according to the table herein set forth.

Where there is not sufficient space for the purpose, then such second or subsequent brand shall be imprinted on the part of such animal next in order, according to the following table:—

- i. Off Neck or Rump (or Thigh);
- ii. Near Shoulder (or Top of Arm);
- iii. Off Shoulder (or Top of Arm).

- (b) In the case of cattle, the first brand shall be imprinted on the near rump or thigh of the animal, and every second or subsequent brand shall be imprinted at a distance of not less than one and a half inches from and directly underneath the brand last imprinted, according to the following table:—

- i. Off Rump (or Thigh);
- ii. Near Shoulder (or Top of Arm);
- iii. Off Shoulder (or Top of Arm).

- (c) In the case of sheep and goats, the first brand shall be imprinted on the near shoulder, and all second or subsequent brands in the following order:—

- i. On Near Side or Ribs;
- ii. Near Rump (or Thigh);
- iii. Off Shoulder;
- iv. Off Side or Ribs;
- v. Off Rump (or Thigh).

- (d) In the case of ostriches:—

- i. On Near Thigh;
- ii. On Off Thigh.

11. Each proprietor of a registered brand shall have the right, in addition to imprinting his brand in the manner above prescribed, to place such brand on the ears of such animals by punching, tattooing or ear-rivets.

12. The owner of any brand may surrender the same, and the Registrar shall, on receipt of notice thereof, cancel the registration by notice in the *Gazette*.

13. When it appears to the Registrar, upon the report of a Deputy Registrar, Native Commissioner, or Cattle Inspector, that a registered brand is not in use, he may cause notice thereof to be given to the owner thereof, calling upon him to shew cause why the same should not be cancelled; if cause is not shewn to the satisfaction of the Registrar within six months after such notice, he may cancel the brand.

14. No brand which has been surrendered or cancelled shall be re-allotted until a period of five years from such surrender or cancellation has elapsed.

15. The Registrar shall, at the end of each quarter in every year, or as soon thereafter as possible, transmit for publication in the *Gazette* a statement, in the form of Schedule "E" hereto, of all brands registered under the Ordinance up to the last day of such quarter.

16. The Registrar shall allot a brand to every public pound already or hereafter to be established, and shall register the same.

The first character of every such brand shall be a diamond, and the second the dominant letter of the magisterial district or sub-district, and the third a numeral, the dominant letter to be placed above the diamond and numeral, so as to form a triangle; and the Poundmaster shall, on sale of any stock impounded therein, brand the same with such brand on the portions and in the order prescribed in these Regulations, to shew that the said brand is the last brand at that time imprinted on such stock; and any Poundmaster who shall fail to comply with the provisions of this section shall on conviction be liable to a fine not exceeding £5.

No. 396 of 1912.]

[26th December, 1912.]

#### RABIES.

UNDER and by virtue of the powers vested in me by section 59 of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare all the districts of Southern Rhodesia to be an area coming under the operation of Part VI. of the said Ordinance, and I do further hereby publish the subjoined regulations for preventing the spread of the disease known as rabies:

1. The regulations published under Government Notice No. 45 of 1909, as amended by Government Notices Nos. 284 of 1911 and 260 of 1912, are hereby repealed, but nothing herein contained shall affect the validity of current notices issued by the Administrator in terms of the said regulations.

2. Any Magistrate, Police Officer, Native Commissioner, Government Veterinary Surgeon, or other official vested with the performance of functions under the "Animals Diseases Consolidation Ordinance, 1904," may on its appearing to him that any dog or other animal is shewing symptoms which justify investigation as to whether such dog or animal is suffering from rabies or not, order the proper detention, isolation and control of such dog or animal, either in the hands of the owner or at some other suitable place.

3. Should any dog shew symptoms which lead to the suspicion that such dog may be suffering from rabies, the owner thereof shall forthwith notify the fact to the nearest official vested with powers under these regulations, who shall immediately report the same to the Chief Veterinary Surgeon, and shall either destroy the said dog or isolate and secure it for further observations.

4. On its appearing that any animal is actually suffering from rabies, any of the above-mentioned officials may order the destruction of such animal, or may himself destroy it, and may further take control of or destroy, if deemed necessary, any animal which has been in contact with a rabid animal or an animal suspected of being rabid.

5. The carcases of all animals destroyed on account of their being infected with rabies shall be thoroughly burnt by the person or official destroying them, save that such parts as may be required for scientific investigation may be retained under proper precautions. In any case in which a human being has been bitten by a rabid animal, the head of such animal shall, if possible, be taken and sent to the nearest veterinary official.

6. (1) In the event of an outbreak of rabies occurring, the Administrator may, by notice in the *Gazette*, direct that all dogs within a radius of fifteen miles of such outbreak, or such other area as may be fixed, shall be kept in a safe enclosure or chained up for a period of not less than six weeks from such notification, or such other period as may be fixed, but may be taken out for exercise if kept on a chain or leash by the person exercising them.

(2) In the event of a suspected outbreak of rabies occurring, the Magistrate of the district may, and at the request of the Chief Inspector of Stock shall, direct that all dogs within a radius of fifteen miles, or such other area as may be deemed necessary, shall be kept in a safe enclosure or chained up for a period not exceeding four weeks, but may be taken out for exercise if kept on a leash or chain by the person exercising them.

(3) No dog shall be removed from any proclaimed area during such period of quarantine.

7. Notwithstanding the provisions of section 6 (1) and (2), packs of fox-hounds, harriers, or beagles, duly registered as such before the Magistrate of the district in which their owner or owners reside, may be used for the purposes of the chase when under the ordinary supervision and control of not less than two persons engaged in the chase.

8. Any person contravening any of the above regulations, or failing to carry out any of the provisions thereof, shall be liable, on conviction, to a fine not exceeding £10 for each offence; or, in default of payment, to imprisonment with or without hard labour for a period not exceeding one month.

9. These regulations shall come into operation on the 1st day of January, 1913.

No. 336 of 1911.]

[26th October, 1911.]

#### RABIES.

THE following instructions regarding the treatment of persons bitten by rabid animals are published for general information.

In every case where a person has been bitten by a dog or other animal known or suspected to be rabid, the following precautions are recommended :—

- (1) The wound should be immediately and thoroughly cauterised. This, if it does not altogether prevent the disease, delays its onset sufficiently for Pasteur treatment to be successfully applied.
- (2) The patient should be sent to Salisbury for treatment at once. Delays are dangerous.
- (3) The fullest information should be sent to the Health Department as to date when bitten, locality, fate of dog, and especially reasons for supposing the dog to be mad.

[1st July, 1912.]

## RABIES.

SEVERAL cases have recently occurred where dogs having bitten a person or persons, were immediately destroyed and report made that they were possibly infected with rabies. In such cases it is impossible for the Veterinary Department to say in less than 18 to 20 days whether the animals were infected or not, and then only when the head of the dog concerned is received at the laboratory in a good state of preservation. Thus valuable time is lost in the treatment of persons bitten, which may lead to fatal results.

In all cases the suspected animal should, if possible, be secured by a strong collar and chain and the circumstances reported by telegram to "Veteran," Salisbury, when full instructions will be given as to the treatment and observation of the suspected animal.

### SUMMARY OF THE "GAME LAW CONSOLIDATION ORDINANCE, 1906," AND REGULATIONS ISSUED THEREUNDER.

The Ordinance divides the game into three distinct classes, described as follows :—

- (a) Birds and Small Buck.
- (b) Bushbuck, Hartebeest, Impala, Lechwe, Pookoo, Roan and Sable Antelope, Sitatunga, Tsessebe, Waterbuck, and Wildebeest.
- (c) Royal Game, which includes Eland, Elephant, Giraffe, Gemsbok, Hippopotamus, Inyala, Koodoo, Ostrich, Rhinoceros, Springbuck and Zebra.

The shooting season for Class "A" is as follows :—

In Mashonaland :

Birds from 1st May to 30th September.  
Small Buck from 1st May to 31st October.

In Matabeleland :

Birds and Small Buck from 1st May to 31st October.

To shoot in Class "A" a licence costing £1 per annum is required. This entitles holders to hunt in both Provinces during the open season.

Class "B."—The season opens on 1st July and closes on 30th November in both Provinces. The licence fee is £25 for non-residents and £5 for persons having their domicile in Southern Rhodesia. This licence entitles the holder to shoot up to 15 head, which number may be increased to a total of 25 upon payment of a further sum of £15 in the one case and £5 in the other.

Class "C."—The Administrator may, if he is satisfied that the animals are actually required for scientific purposes, grant to the holder of a game licence permission to shoot or capture any of the species included in this Class. Such permit requires a £5 stamp. Applications in writing, together with proof of *bona-fides*, should be addressed to the Director of Agriculture,

Game for Farming Purposes.—Permits may be granted for the capture of Eland, Ostrich, Zebra or other animals for the purposes of breeding or farming. Such permits require a stamp of the value of £1 and remain in force for six months. Application, accompanied by a sworn declaration, should be made through the Director of Agriculture or the Civil Commissioner of the district.

Game Injuring Crops.—The occupier of any cultivated land or any person acting under the authority of such occupier, may at any time destroy game actually doing damage on such land.

Elephants on Occupied Farms, Melsetter.—The destruction of Elephants when found on occupied farms on the High Veld in Melsetter District is authorised (*vide* Government Notice No. 284 of 1908).

Tsetse Fly Areas.—Government Notices Nos. 201 and 227 of 1913 suspend the close season for all classes of game, with the exception of ostriches and other birds classified as game, within the following areas in the Hartley district and the Sebungwe district for a period of one year from 1st July, 1913:—

Hartley District.—From the railway bridge on the Umfuli River, thence north-westwards along the Umfuli River to where it joins the Umniati River, thence southwards along the Umniati River to where it joins the Umsweswe River, thence eastwards along the Umsweswe River up to the drift at the Lydia Mine, thence along the old road from Lydia Mine to Etna Mine and to Inez Mine, thence northwards along the road from Inez Mine to Hartley, thence in the direction of the railway bridge to the starting point on the Umfuli River.

Sebungwe District.—From the confluence of the Sengwe and Lutope Rivers up the Lutope to its headwaters, thence in a south-east and easterly direction following the southern edge of the escarpment, leaving Meare's farm to the south, to the Mafungabusi Peak, thence northwards along the escarpment to the Njelele River, and down that river to its confluence with the Sanyati River, thence northwards down the Sanyati River to its confluence with the Piriwiri River, thence direct in a north-westerly direction to Picaninyemba, and thence along the footpath to Nenyunka on the Sengwe River, thence southerly up the Sengwe River to its confluence with the Lutope.

Game may be shot in these areas without a licence.

Game in Class "A" may be hunted in the close season until further notice on private land in the Melsetter district by holders of a licence.

Protected Areas.—No game may be hunted or killed within the limits of the Commonage or Townlands of Bulawayo and within a radius of two miles of the Court House, Gwelo, or within the Urungwe Game Sanctuary, as defined by Government Notice No. 237 of 1906.

"Locust Birds" are strictly protected, *vide* Government Notice No. 121 of 1907.

Export of Game.—No living Game or the Eggs of any Game Birds may be exported beyond the limits of Southern Rhodesia without a written permit.

Shooting on Private Land.—A licence does not entitle the holder thereof to shoot on private land without the permission of the land-owner.

No. 202 of 1913.]

#### HIPPOTOTAMI.

[4th July, 1913.

UNDER and by virtue of the powers vested in me by the "Game Law Consolidation Ordinance, 1906," I do hereby cancel Government Notice No. 114 of 1913, which suspended the operations of the said Ordinance in so far as it related to certain hippopotami in the Ingesi River in the native district of Insiza.

No. 228 of 1913.]

#### ELEPHANTS, HARTLEY DISTRICT.

[24th July, 1913.

UNDER and by virtue of the powers vested in me by section 4 (2) of the "Game Law Consolidation Ordinance, 1906," I do hereby suspend the operations of sections 9, 10 and 12 of the said Ordinance in so far as they relate to elephants on or within five miles from the farm Dawn, in the Hartley district, for a period of six months from date hereof.

No. 390 of 1912.]

[19th December, 1912.]

## PROTECTION OF LOCUST BIRDS.

UNDER and by virtue of the powers vested in me by the "Game Law Consolidation Ordinance, 1906," I do hereby declare that the following Locust Birds :—

- (1) Great Locust Bird or White Stork (*Ciconia alba*);
- (2) Lesser Locust Bird or Nordmann's Pratincole (*Glarcola melanoptera*);
- (3) Small White Heron or Cattle Egret (*Bubulcus ibis*);
- (4) Wattled Starling (*Dilophus carunculatus*);

are added to class "A" of the said Ordinance, and shall be strictly protected, and not hunted or destroyed, throughout Southern Rhodesia for a period of five years from date hereof.

No. 240 of 1910.]

[1st September, 1910.]

## INSECT PESTS.

UNDER and by virtue of the powers vested in me by the "Nurseries Ordinance, 1909," I hereby proclaim the undermentioned insects to be pests within the meaning of the said Ordinance :—

- The Red Scale (*Chrysomphalus aurantii*).
- The Oleander Scale (*C. hederæ*).
- The Circular Purple Scale (*C. aonidum*).
- Ross's Black Scale (*C. rossi*).
- The Purple or Mussel Scale (*Lepidosaphes beckii*).
- The Long Scale (*L. gloverii*).
- The White Peach Scale (*Aulacaspis pentagona*).
- Woolly Aphid or American Blight (*Schizoneura lanigera*).

No. 228 of 1912.]

[11th July, 1912.]

## IMPORTATION OF PLANTS REGULATION ORDINANCE, 1904.

UNDER and by virtue of the powers vested in me by the "Importation of Plants Regulation Ordinance, 1904," I do hereby declare and make known that Government Notices No. 306 of 1911 and No. 35 of 1912 are hereby repealed, and section 17 of the Regulations published under Government Notice No. 141 of 1906 is hereby repealed and the following regulation substituted in lieu thereof :—

- "17. The introduction into Southern Rhodesia of any plant, not being seed, fruit, bulb, tuber, cut flower, vegetable or vegetable transplant originating in the Union of South Africa, not grown in a nursery registered at the Department of Agriculture, Pretoria, under the 'Agricultural Pests Act, 1911,' is prohibited, except under special permission from the Director of Agriculture, Salisbury, Southern Rhodesia, who may impose such conditions in regard to such importation as he may think fit."

No. 319 of 1912.]

[3rd October, 1912.]

## IMPORTATION OF POTATOES INTO SOUTHERN RHODESIA.

UNDER and by virtue of the powers vested in me by the "Importation of Plants Regulation Ordinance, 1904," I do hereby cancel the regulations published under Government Notice No. 309 of 1909, and do substitute the following in lieu thereof :—

(1) No person shall introduce into Southern Rhodesia from outside British South Africa any consignment of potatoes unless accompanied by a statement on oath from the consignor stating fully in what country, and district of that country, the potatoes were grown, and a certificate from the Department of Agriculture or other responsible Government body or official institution of that country to the effect that the disease known as "warty disease" or "black scab," caused by the fungus *synchytrium endobioticum* Percival, is not known to occur on the farm or premises on which the potatoes were grown. Any consignment not accompanied by such documents will be liable to be seized and destroyed.

(2) Any consignment of potatoes imported from other parts of South Africa or from overseas, if found on inspection to be infested with the pest known as "root gall worm" (*helerodera radicola*) will be refused admittance to Southern Rhodesia or destroyed.

(3) Should any consignment on arrival be found to be infested with "warty disease" or "black scab," it will be totally destroyed.

(4) Any person guilty of a contravention of these regulations will be liable to a fine not exceeding £10.

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No. 249 of 1908.]

[27th August, 1908.

#### PROTECTION OF TREES.

IT is hereby notified for public information that any person who shall cut down for use as fuel, or for any other purposes than *bona-fide* farming, mining or manufacturing purposes, or cause to be so cut down the "Wild Westeria" (native name M'Pakwa or M'poea) tree, will be liable to prosecution for contravention of the provisions of the Forest and Herbage Preservation Act, 1859, and upon conviction to a fine not exceeding £100, or to imprisonment with or without hard labour for a term not exceeding six months, or to such fine and imprisonment, or to such imprisonment without a fine.

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No. 91 of 1913.]

[20th March, 1913.

#### DESTRUCTION OF WILD CARNIVORA.

IT is hereby notified for public information that His Honour the Administrator has been pleased to cancel Government Notices No. 216 of 1911 and No. 387 of 1911, as from the 31st instant, from which date rewards for the destruction of wild carnivora will be discontinued.

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No. 226 of 1913.]

[24th July, 1913.

#### ESTABLISHMENT OF A POUND AT THE INYATI RESERVE, IN THE MAGISTERIAL DISTRICT OF BULAWAYO.

UNDER and by virtue of the powers vested in me by section 5 of the "Pounds and Trespasses Ordinance, 1903," I do hereby declare and make known that at the request of the Civil Commissioner, Bulawayo, a pound has been established at Inyati, in the Inyati Reserve, in the magisterial district of Bulawayo, and that the said pound shall be available to the public from the 1st August, 1913.



No. 211 of 1909.]

[16th September, 1909.

## PRODUCE FROM NATAL AND TRANSVAAL.

UNDER and by virtue of the power vested in me by section 8 (2) of the "Animals Diseases Consolidation Ordinance, 1904," I do hereby prohibit the introduction from Natal and the Transvaal of the undermentioned produce thereof:—Grass, straw, hay, lucerne hay, forage, green lucerne, sugar cane, or any other bedding or fodder plant.

## FULL TEXT OF "HERBAGE PRESERVATION ORDINANCE, 1913."

AN ORDINANCE to prevent the destruction of Herbage, Trees and Shrubs by Fire.

BE IT ENACTED by the Administrator of Southern Rhodesia, with the advice and consent of the Legislative Council thereof, as follows:—

So much of the "Forest and Herbage Preservation Act, 1859," of the Colony of the Cape of Good Hope, and of any amendment thereof, as may be inconsistent with the provisions of this Ordinance, is hereby repealed.

Any person who shall, without lawful authority so to do, wilfully or by gross negligence set fire to or kindle any fire which by spreading shall set fire to any tree, shrub, bush, brushwood, undergrowth or grass not his property, shall be guilty of the offence of contravening this section, and shall upon conviction be liable to a fine not exceeding £100, or, in default of payment of any fine imposed, to imprisonment with or without hard labour for a period not exceeding one year, or to corporal punishment in any number of lashes or cuts with a cane or rod not exceeding fifteen, or to the above imprisonment without the option of a fine, or to any two of the above-mentioned punishments.

All Magistrates and Assistant Magistrates, and all Native Commissioners and Assistant Native Commissioners, in respect of persons over whom they have jurisdiction by law, shall have jurisdiction to impose summarily the punishment above set out.

The Court before which any conviction for a contravention of section two of this Ordinance takes place may, during or immediately after the trial, take and hear evidence as to the amount of damage caused by any contravention of the section, and may assess such damage to an amount within the civil jurisdiction of such Court and give judgment against the offender for the amount of the damage so assessed; provided always that such proceedings shall not be taken unless the offender has had reasonable notice that the amount of damage caused will be enquired into.

Nothing in this Ordinance shall be taken to affect the right of any person aggrieved to recover damages by civil action for any loss sustained by himself, unless he shall have availed himself of the provisions of section four hereof.

In such areas as the Administrator, on the petition of an actual majority of owners or occupiers representing not less than two-thirds of the land in such areas, may prescribe, any owner or occupier of land who desires to guard against fires crossing the boundaries thereof, may call upon the occupier of any adjoining land to contribute one-half of the labour or cost necessary to provide sufficient fire-guards on the common boundary. If any person so called upon shall refuse or neglect to contribute as aforesaid, the person so calling on him may proceed with the construction of a fire-guard and recover half the necessary cost of such construction from such first-mentioned person. The width of a fire-guard shall be such as the Administrator may prescribe at the instance of the petitioners, but in no case shall it be less than fifteen feet on each side of the common boundary. For the purposes of this section the term "owner or occupier" shall mean, in respect of native reserves, the British South Africa Company.

Any person who is lawfully upon the land of another or upon any road, outspan or vacant land, shall carefully and properly extinguish any fire

kindled or used by him, and until he has so done shall not proceed such a distance from any such fire as to be unable to control it by himself or his servants.

No person shall pursue any kind of animal, or knowingly enter upon the land of another with the intention of pursuing any kind of animal, without the consent of the owner or occupier of such land.

No person shall take or remove honey or bees from the land of another without the consent of the owner or occupier of the land upon which the honey or bees may be.

Any person trespassing upon any land enclosed by a sufficient fence, or being found upon such land away from a recognised road or path, shall be liable to the penalties hereinafter set out.

Every prospector proceeding to prospect for minerals, under and by virtue of any prospecting licence, upon occupied land, shall give notice to the occupier of his intention to prospect.

Every person, before proceeding to burn growing or standing herbage, grass or bush upon his own land, shall give reasonable notice to adjoining occupiers of his intention so to do. Such notice shall state as nearly as may be done the time at which such burning will take place.

Nothing in this Ordinance shall be taken to prevent a person, when his life, person, or property are in danger from an approaching fire, from setting alight to and burning grass, herbage, or bush, in the manner commonly known as counter-firing, in order to prevent such injury or loss; provided that reasonable care is taken that a fire kindled does not spread beyond the limits necessary to secure safety from injury and loss.

If any servant when acting under the direction or command of his employer by omission or by act of commission shall contravene any of the provisions of this Ordinance, then such employer and the servant may both or either of them be prosecuted, and if convicted punished under this Ordinance.

The penalties for any act or omission in contravention of the provisions of this Ordinance shall be, unless otherwise specifically provided—

- (1) for the contravention of sections eleven and twelve a fine of £5, or in default of payment of any fine imposed, imprisonment with or without hard labour for a period not exceeding one month;
- (2) for the contravention of sections seven, eight, nine and ten a fine of £10, or in default of payment of any fine imposed, imprisonment with or without hard labour for a period not exceeding three months;

provided that should any act or omission complained of also result in a contravention of section two, prosecution may follow under that section.

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## Department of Posts and Telegraphs,

Southern Rhodesia.

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Postal Notice No. 12 of 1913.

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### AGRICULTURAL PARCELS POST.

IT is hereby notified for public information that, on and after the 1st August, 1909, any article produced, and, if manufactured, produced and manufactured within Southern Rhodesia may be transmitted by Agricultural Parcels Post at the reduced rate of threepence per lb. or fraction thereof, up to a limit of eleven lbs. in weight.

The Agricultural Parcels Post is designed to bring the producer into direct communication with the consumer, and is available for the transmission of :—

|                        |             |              |
|------------------------|-------------|--------------|
| Biscuits               | Dried Meats | Plants       |
| Bread                  | Eggs        | Poultry      |
| Butter                 | Flour       | Seeds        |
| Confectionery          | Flowers     | Sugar        |
| Cigarettes             | Honey       | Tobacco      |
| Dried & Bottled Fruits | Jam         | Wool Samples |

and other articles produced within Southern Rhodesia. It does not extend beyond the borders of Southern Rhodesia.

The senders of articles at the reduced tariff applicable to the Agricultural Parcels Post will be required to sign a declaration that the contents are the *bona fide* produce of Southern Rhodesia.

The limits of size and weight, and the general regulations, are those applicable to the Inland Parcels Post.

G. H. EYRE,  
Postmaster General.

General Post Office, Salisbury,  
31st March, 1913.

#### REDUCED RATES FOR MEALIE MEAL.

THE Beira and Mashonaland and Rhodesia Railways announce that, with effect from 1st June, 1913, an amended scale of rates will apply to Mealie Meal, particulars of which may be obtained from the Traffic Manager or Stationmasters. As a temporary measure, the revised scale will apply also to Meal manufactured from imported Maize.

#### REDUCTIONS IN RATES.

THE Beira and Mashonaland and Rhodesia Railways announce that reductions in Rates have been authorised on the items quoted hereunder, and will be brought into operation from a date to be agreed upon with the Chambers of Commerce in Rhodesia :—

1. Cement, Galvanised Iron and Timber—minimum 10 tons.
2. Fencing Material.
3. Iron—angle, bar, bulb, channel, sheet, rod and T (unworked), *undamageable*. Firebars, tappets, cams and cam shafts, shoes and dies, stems and heads, rails and iron sleepers, *undamageable*.
4. Petrol, in solid iron or steel drums.
5. Class Rates 1, 2, 3 and 4 on the Salisbury-Gwelo Section and Blinkwater Branch.
6. Live Stock and Vehicle Rates, Beira-Salisbury Section.
7. Public Telegrams. Beira-Macequece Line.

Full particulars may be obtained from the Traffic Manager, District Traffic Superintendents, or C. Corner, Acting General Manager.

#### REDUCED RATE FOR PARAFFIN (FOR GENERATING POWER IN ENGINES).

THE Beira and Mashonaland and Rhodesia Railways announce that, with effect from the 1st July, 1913, Paraffin (for generating power in engines) in minimum consignments of 10 tons, or paying therefor, will be conveyed at the 5th class rate at Owner's Risk, provided the consignment notes are endorsed declaring the value not to exceed 5s. per case of ten American or eight Imperial gallons.

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